NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO–ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).

LEGEND:

- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE

DRAFT STATUS:
07.11.2018

SCALE 1:1000
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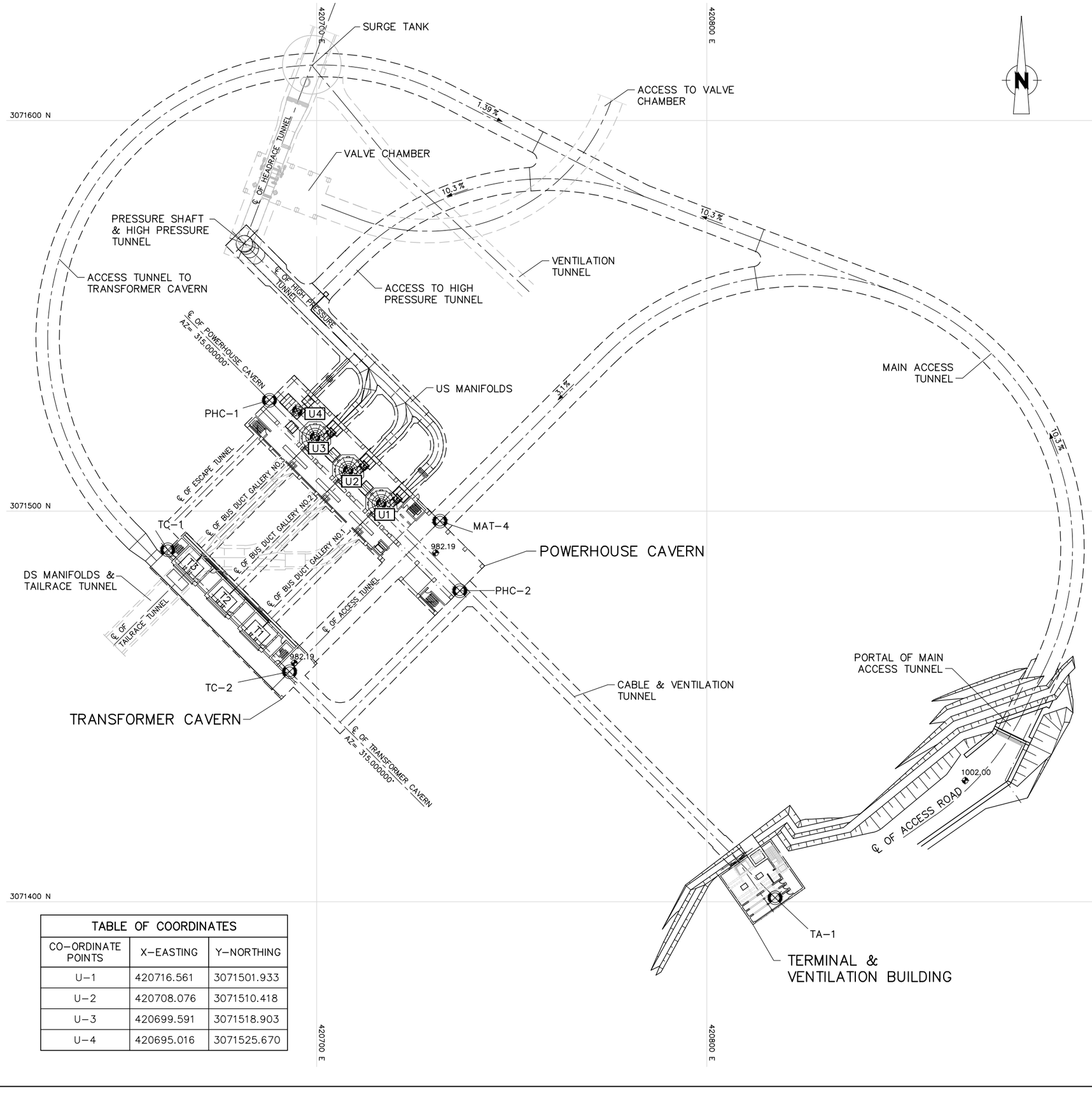
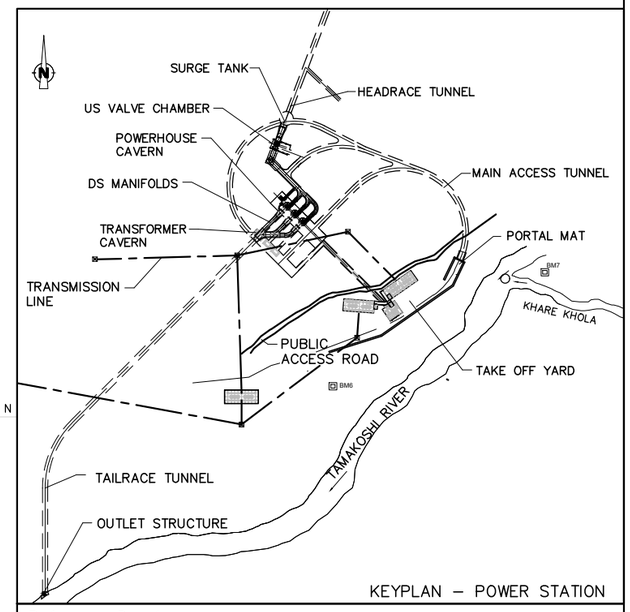


TABLE OF COORDINATES		
CO–ORDINATE POINTS	X–EASTING	Y–NORTHING
U–1	420716.561	3071501.933
U–2	420708.076	3071510.418
U–3	420699.591	3071518.903
U–4	420695.016	3071525.670



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title

Revisions	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31–00053–DD–4364–Y–0000_–

CAD– File No.:

DETAILED DESIGN

POWER STATION

GENERAL

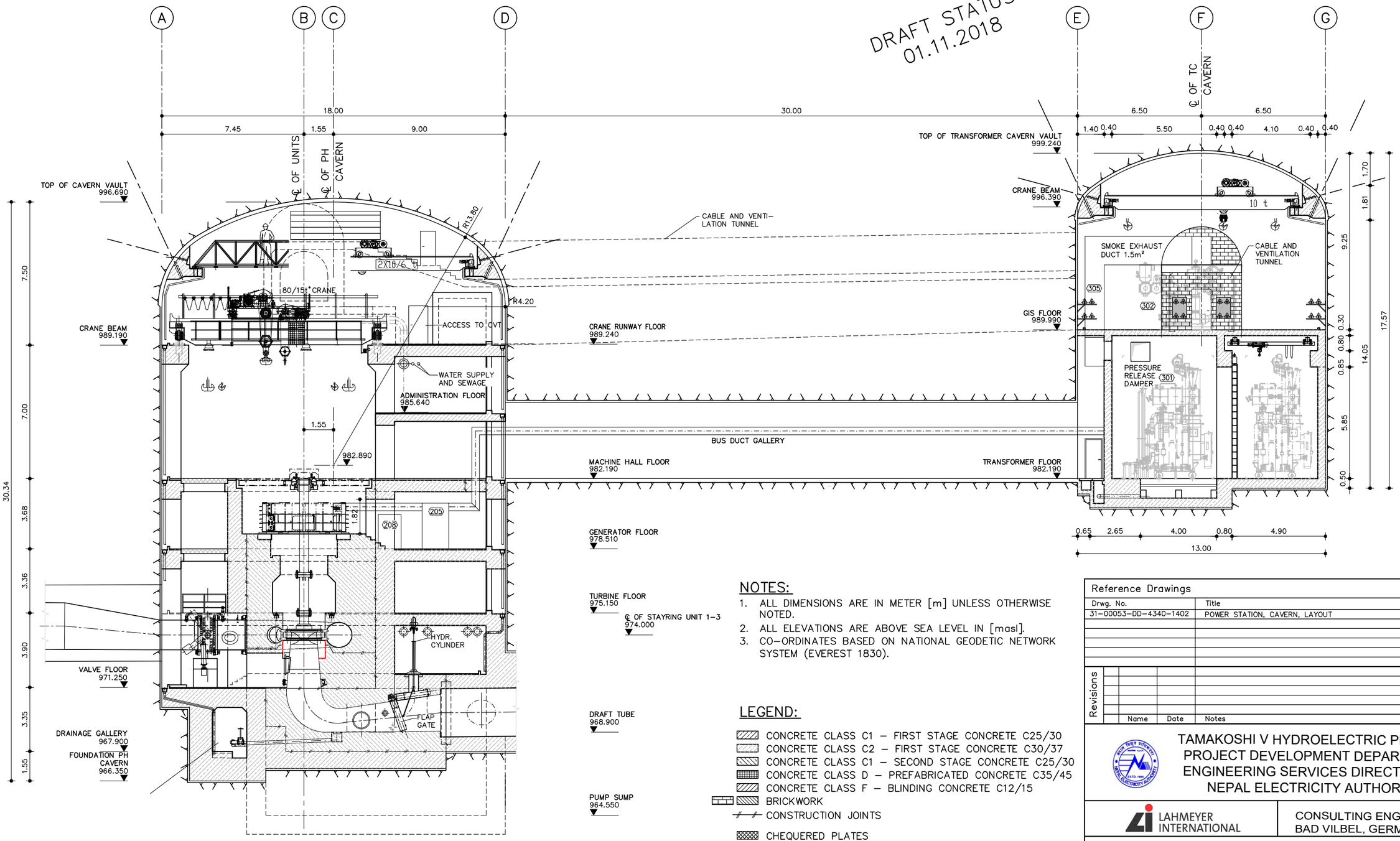
LAYOUT

PROJECT DRAWING

Scale A3: 1:1000

Drwg. No.: 31–00053–DD–4340–Q 1400 REV. –

DRAFT STATUS:
01.11.2018



A

TYPICAL SECTION
POWERHOUSE – TRANSFORMER CAVERN
SCALE 1:200

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO–ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).

LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS C2 – FIRST STAGE CONCRETE C30/37
- CONCRETE CLASS C1 – SECOND STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE
- (206) NUMBER OF EL–ME EQUIPMENT REFER TO LIST OF EQUIPMENT

SCALE 1:200
–2 0 2 4 6 8 10 [m]

Reference Drawings

Drwg. No.	Title
31–00053–DD–4340–1402	POWER STATION, CAVERN, LAYOUT

Revisions

	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31–00053–DD–4344–Y–0000_–

CAD– File No.:

Scale A3: 1:200

DETAILED DESIGN

POWER STATION

POWERHOUSE & TRANSFORMER CAVERN

TYPICAL SECTION

PROJECT DRAWING

Drwg. No.: 31–00053–DD–4340–Q 1401 REV. –

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO-ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).

LEGEND:

CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30

UNFINISHED TOP OF SLAB

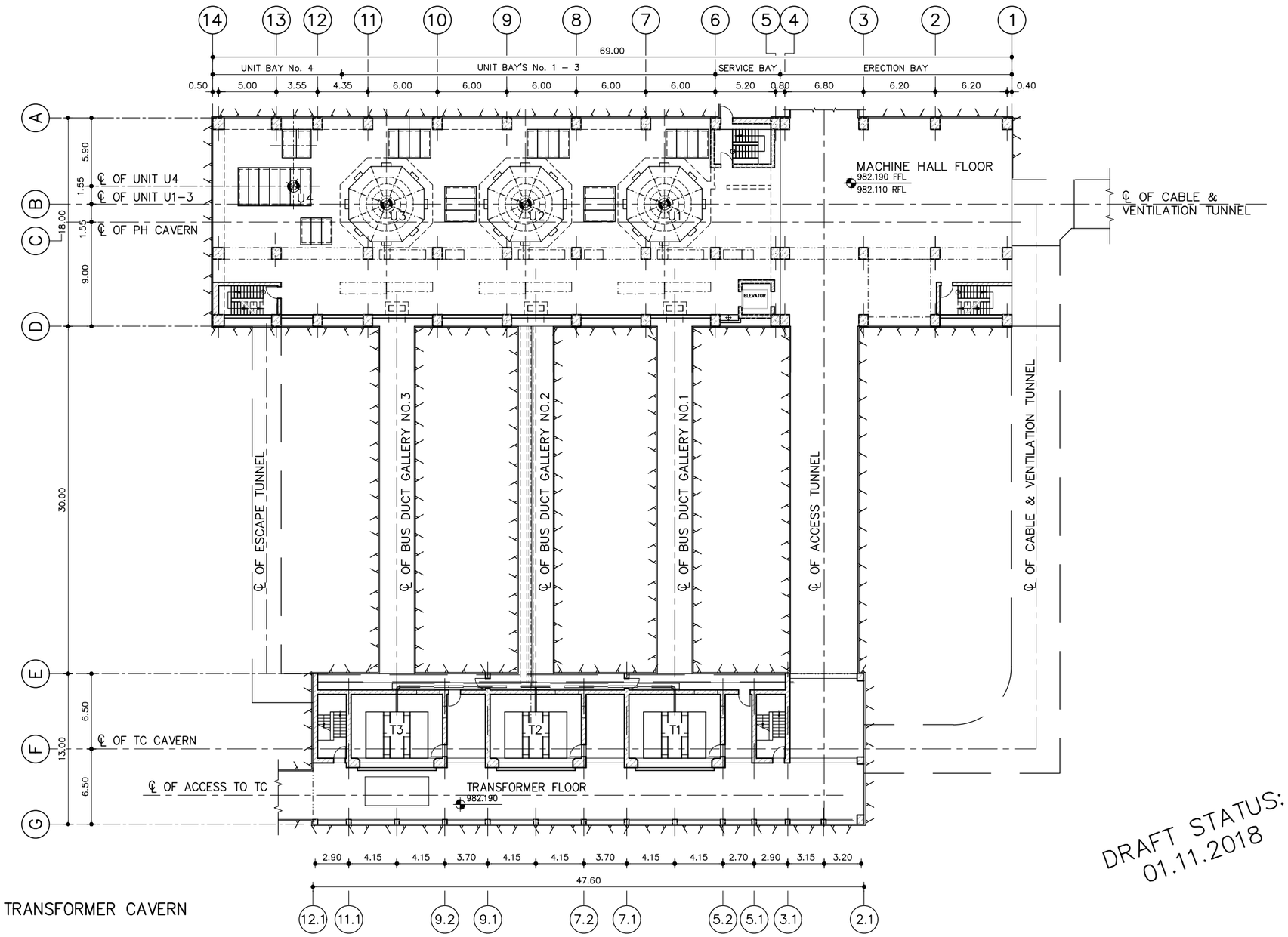
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SCALE 1:400

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UPSTREAM

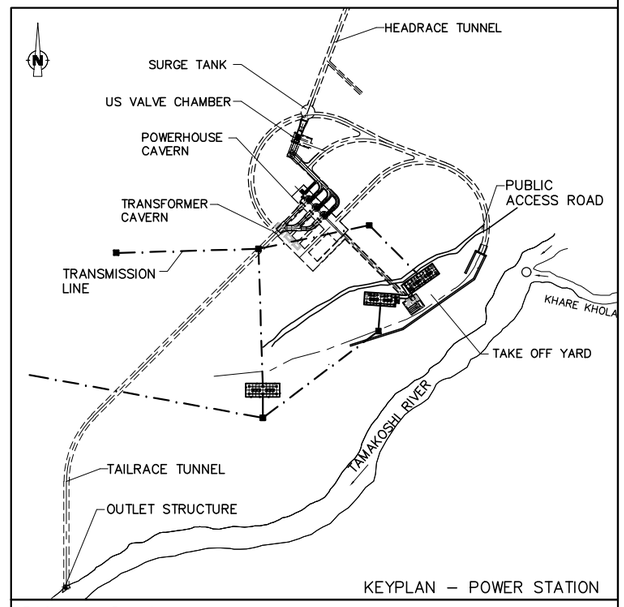
POWERHOUSE CAVERN



TRANSFORMER CAVERN

DOWNSTREAM

DRAFT STATUS:
01.11.2018



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31–00053–DD–4344–1400	POWER STATION, OVERALL LAYOUT

Revisions	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31–00053–DD–4344–Y–0000_–

CAD– File No.:

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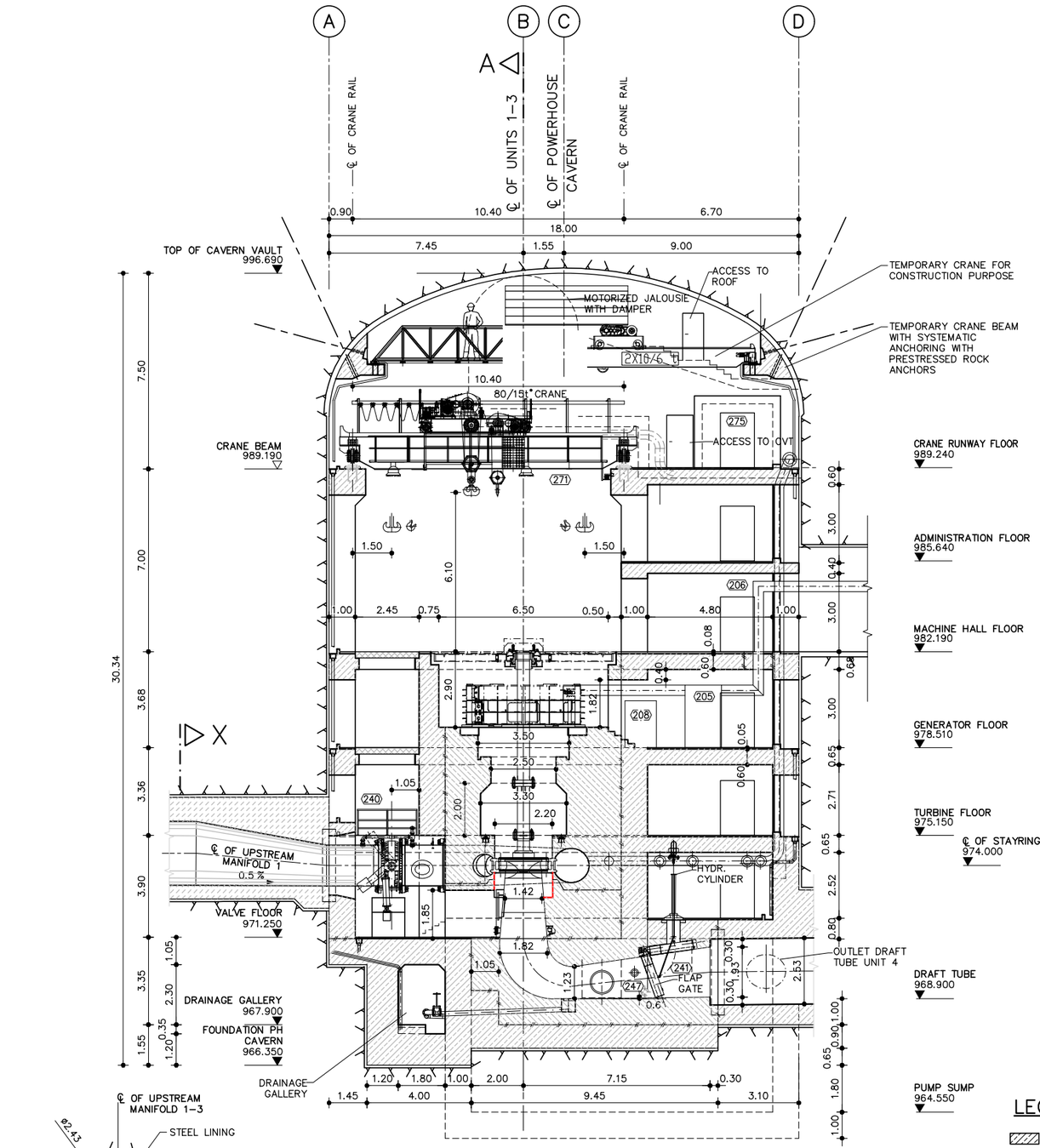
DETAILED DESIGN

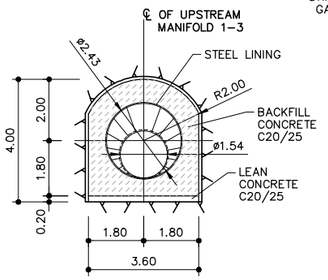
POWER STATION

POWERHOUSE & TRANSFORMER CAVERN LAYOUT

PROJECT DRAWING

Drwg. No.: 31–00053–DD–4340–Q 1402 REV. –





SECTION X–X
MANIFOLD 1–3
TYPICAL SECTION

SECTION 1–1
THROUGH ℄ OF UNIT 1
SCALE 1:200

LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS C2 – FIRST STAGE CONCRETE C30/37
- CONCRETE CLASS C1 – SECOND STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE
- (206) NUMBER OF EL–ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

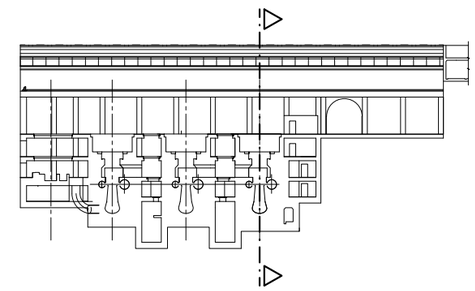
NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO–ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).
4. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
5. ROCK SUPPORT MEASURES NOT SHOWN.
6. ROCK DRAINAGE SYSTEM WITH SYSTEMATIC DRAIN HOLES NOT SHOWN.
7. BRICK WALLS ARE PROVIDED IN ELECTRICAL ROOMS TO CLOSE OFF THE ROOM AGAINST THE SHOTCRETE SURFACE. ONE DOOR W/H = 0.60/1.80 M IN EACH BRICK WALL HAS TO BE PROVIDED FOR ACCESS TO SHOTCRTE SURFACE.

DRAFT STATUS:
01.11.2018

SCALE 1:200
−2 0 2 4 6 8 10 [m]

KEYPLAN



Reference Drawings

Drwg. No.	Title
31–00053–DD–4344–1411...	POWERHOUSE CAVERN, PLAN AND SECTIONS

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31–00053–DD–4344–Y–0000_–

CAD– File No.:

Scale A3: 1:200

DETAILED DESIGN

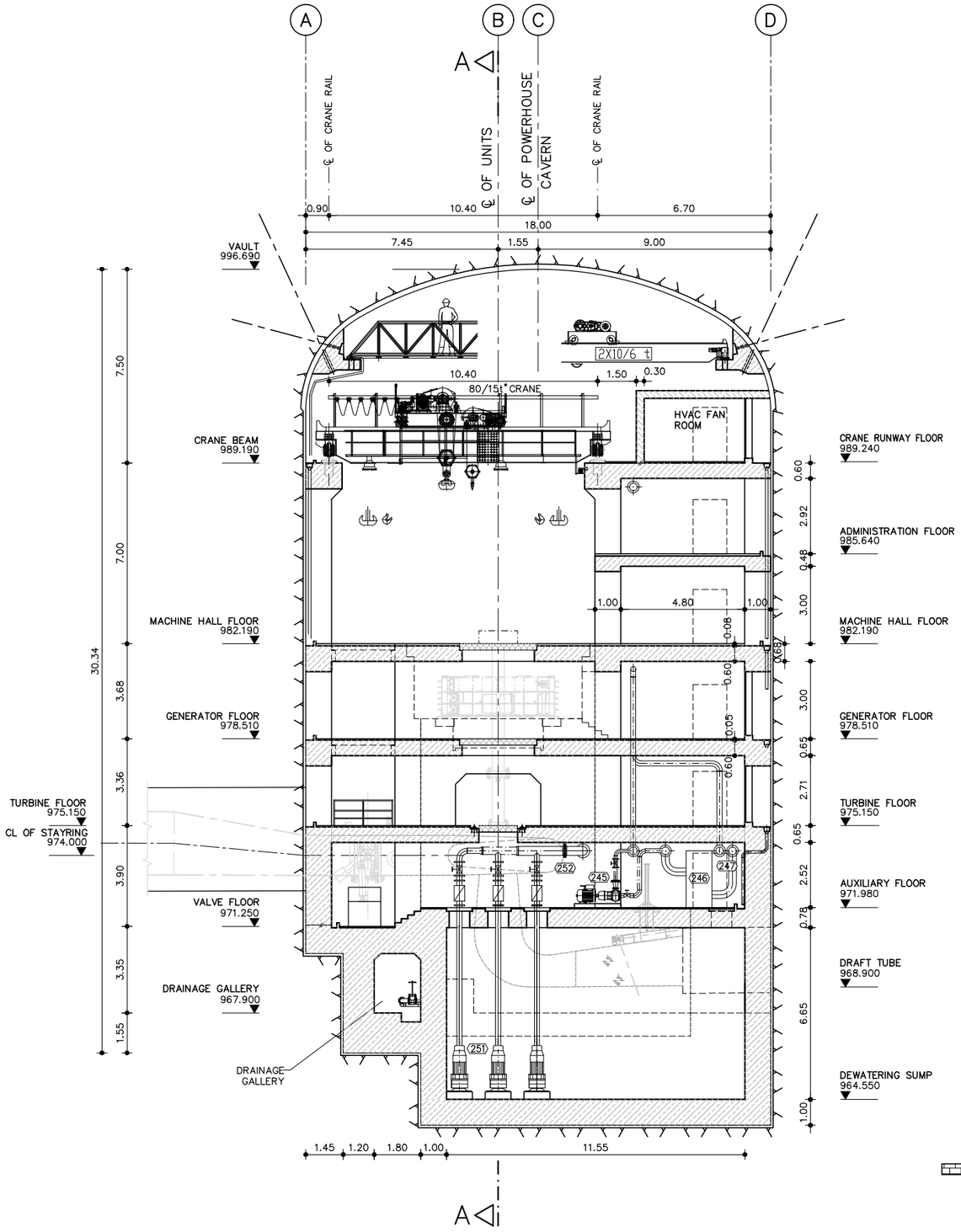
POWER STATION

POWERHOUSE CAVERN

CROSS SECTION
THROUGH ℄ OF UNIT 1

PROJECT DRAWING

Drwg. No.: 31–00053–DD–4344– Q 1410 REV. –



SECTION 2–2
THROUGH DEWATERING SUMP
SCALE 1:200

LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS C2 – FIRST STAGE CONCRETE C30/37
- CONCRETE CLASS C1 – SECOND STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE
- (206) NUMBER OF EL–ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

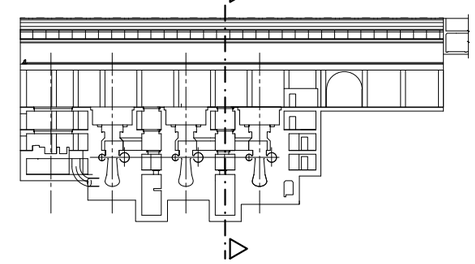
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DRAFT STATUS:
01.11.2018

SCALE 1:200
−2 0 2 4 6 8 10 [m]

KEYPLAN



Reference Drawings

Drwg. No.	Title
31–00053–DD–4344–1411...	POWERHOUSE CAVERN, PLAN AND SECTIONS

Revisions	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

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Prepared	B. Khadka	31.07.17
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Approved	Dr. Moeller	

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31–00053–DD–4344–Y–0000_–

CAD– File No.:

Scale A3: 1:200

DETAILED DESIGN

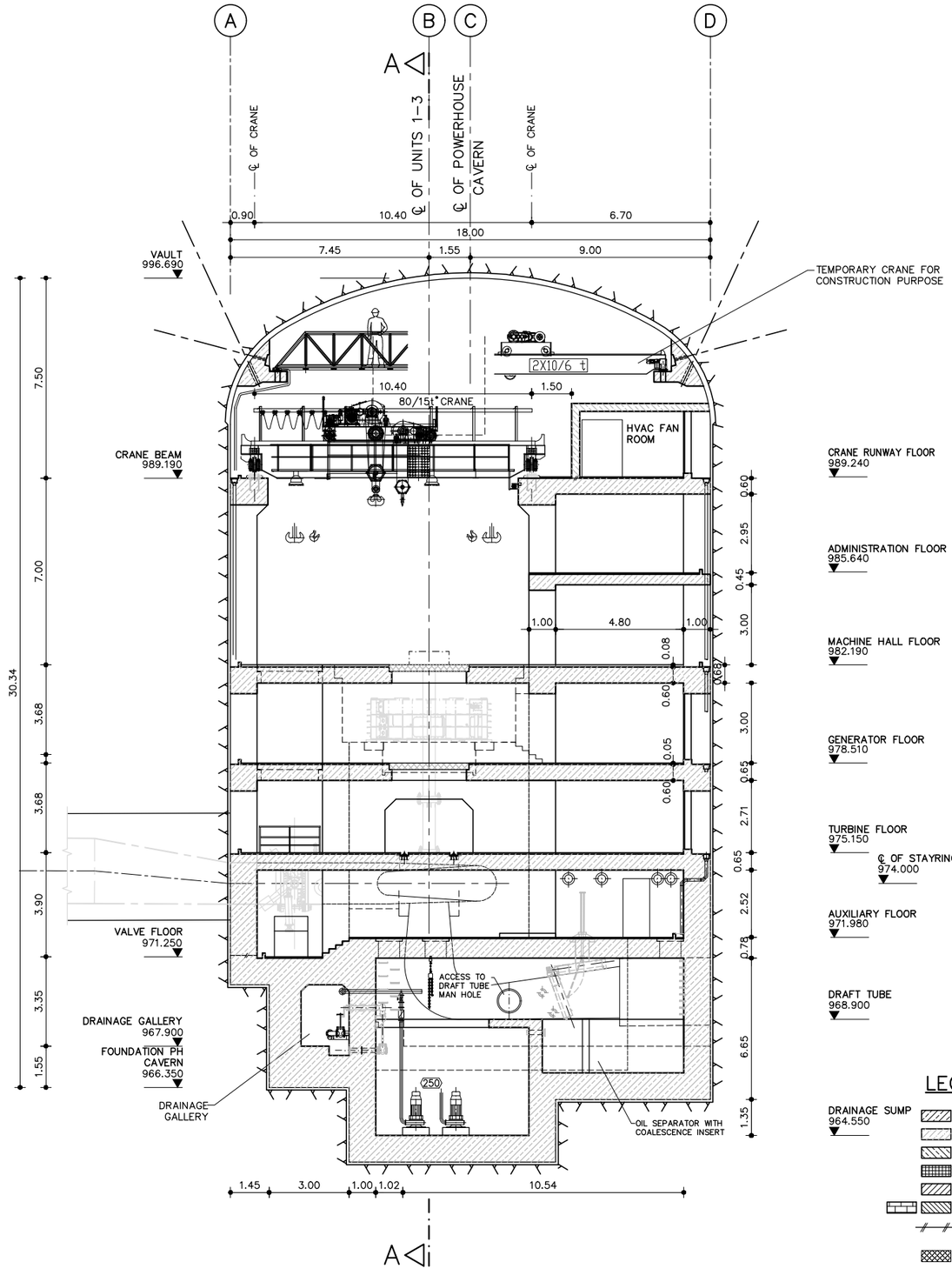
POWER STATION

POWERHOUSE CAVERN

CROSS SECTION
THROUGH DEWATERING SUMP

PROJECT DRAWING

Drwg. No.: 31–00053–DD–4344–Q 1411 REV. –



SECTION 3–3
THROUGH DRAINAGE SUMP
SCALE 1:200

NOTES:

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5. ROCK SUPPORT MEASURES NOT SHOWN.
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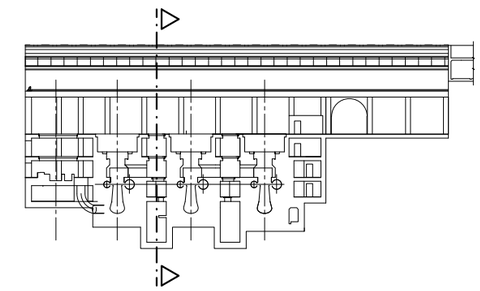
DRAFT STATUS:
01.11.2018

SCALE 1:200
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LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS C2 – FIRST STAGE CONCRETE C30/37
- CONCRETE CLASS C1 – SECOND STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE
- (206) NUMBER OF EL–ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

KEYPLAN



Reference Drawings

Drwg. No.	Title
31–00053–DD–4344–1411...	POWERHOUSE CAVERN, PLAN AND SECTIONS

Revisions	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	31.07.17
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31–00053–DD–4344–Y–0000_–

CAD– File No.:

Scale A3: 1:200

DETAILED DESIGN

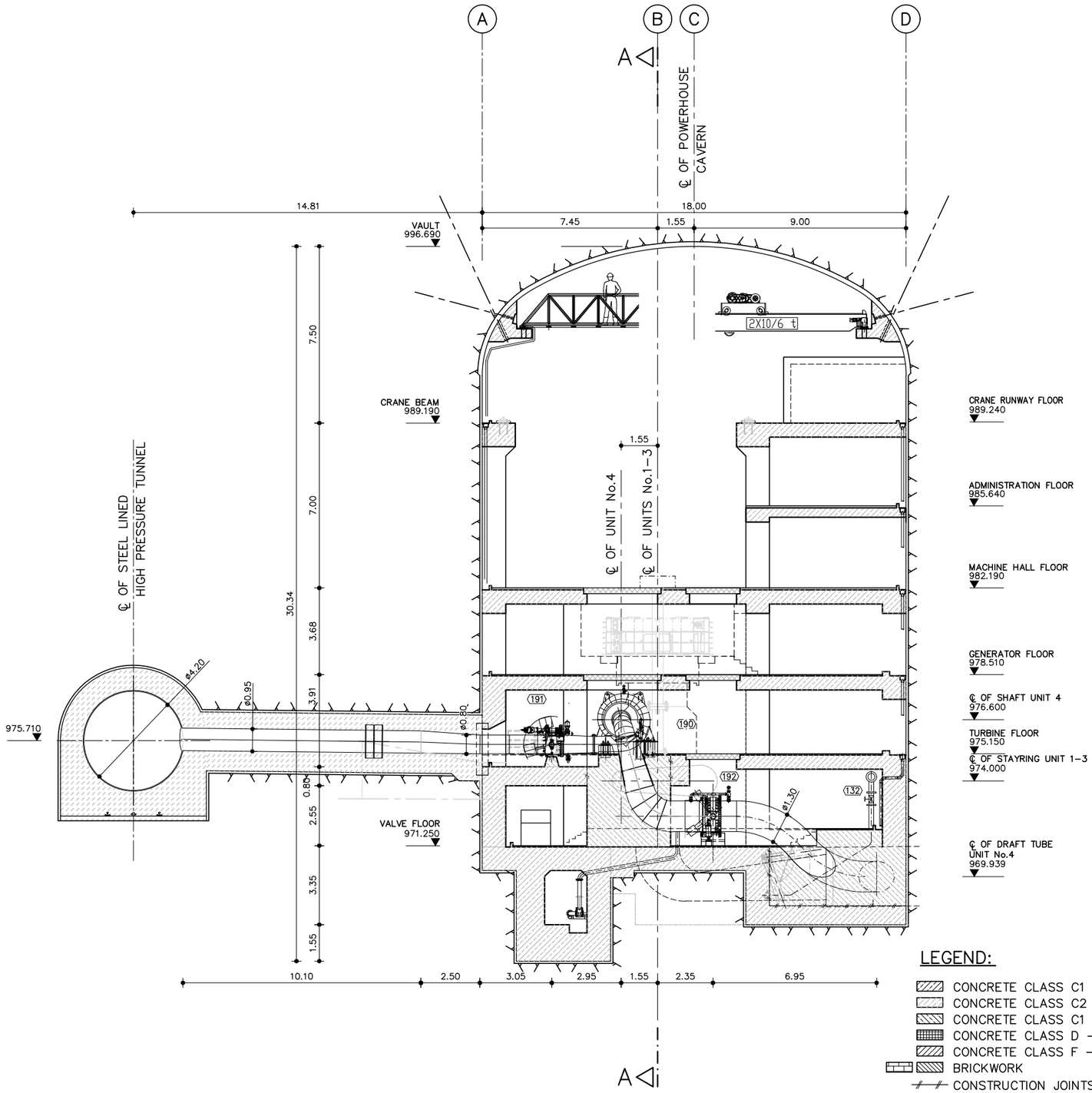
POWER STATION

POWERHOUSE CAVERN

CROSS SECTION
THROUGH DRAINAGE SUMP

PROJECT DRAWING

Drwg. No.: 31–00053–DD–4344–Q 1412 REV. –



SECTION 4–4
THROUGH ℄ OF UNIT 4
SCALE 1:200

LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS C2 – FIRST STAGE CONCRETE C30/37
- CONCRETE CLASS C1 – SECOND STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE
- (206) NUMBER OF EL–ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

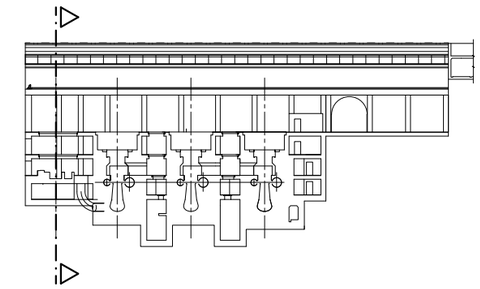
NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO–ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).
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DRAFT STATUS:
01.11.2018

SCALE 1:200
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KEYPLAN



Reference Drawings

Drwg. No.	Title
31–00053–DD–4344–1411...	POWERHOUSE CAVERN, PLAN AND SECTIONS

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	31.07.17
Checked	Roloff	
Approved	Dr. Moeller	

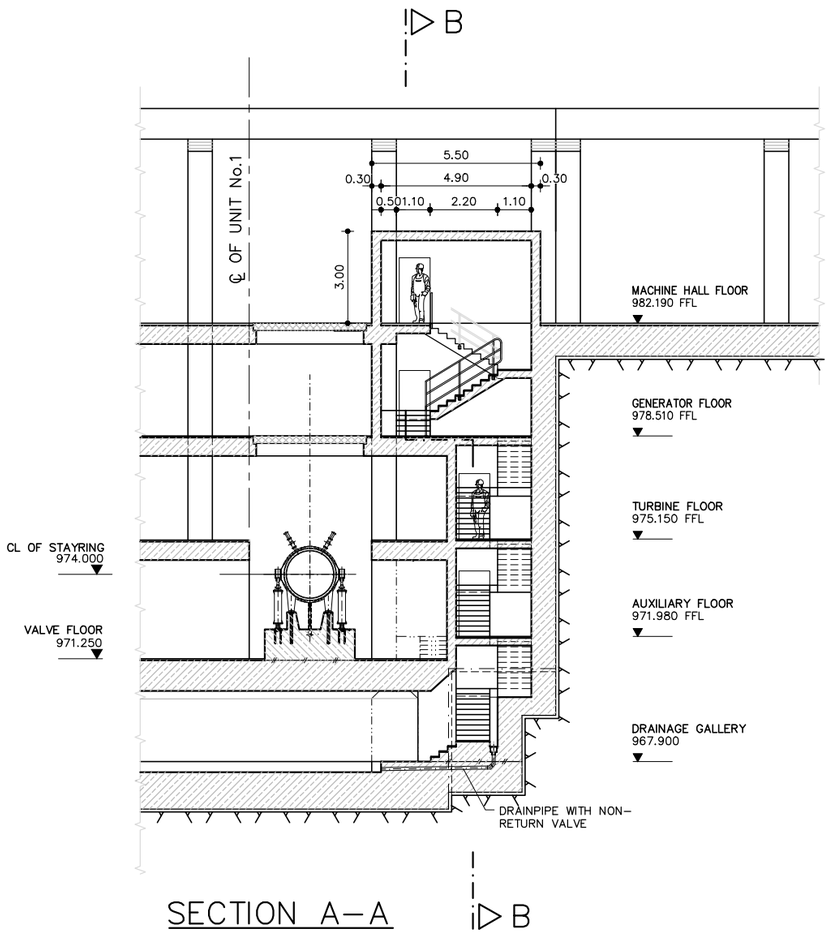
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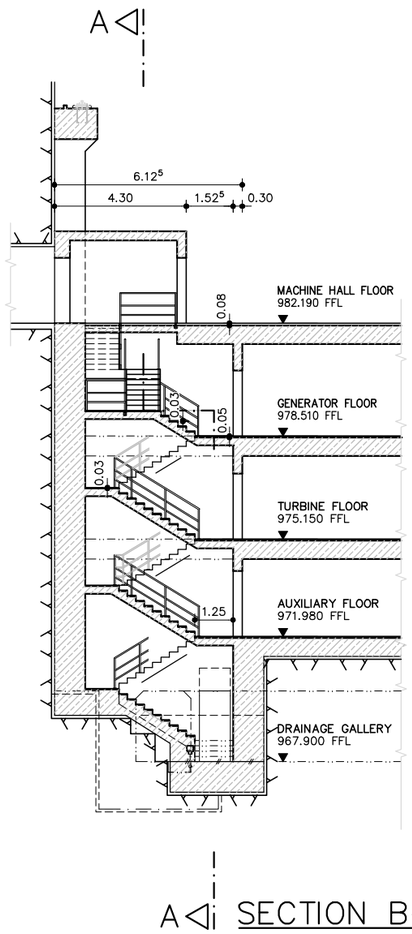
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DETAILED DESIGN
POWER STATION
POWERHOUSE CAVERN
CROSS SECTION
THROUGH ℄ OF UNIT 4
PROJECT DRAWING

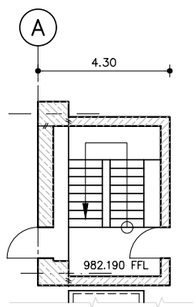
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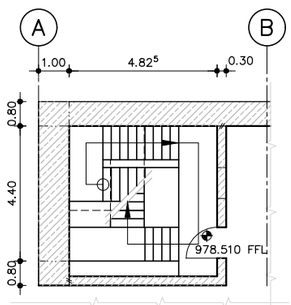
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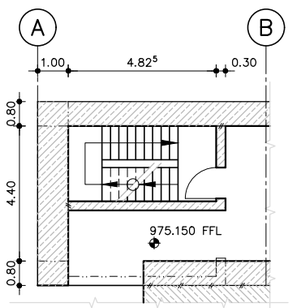
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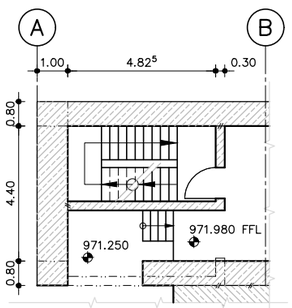
MACHINE–FLOOR



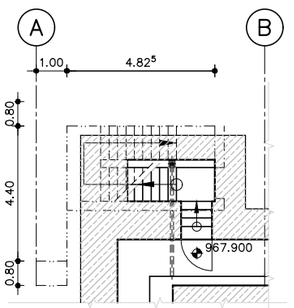
GENO–FLOOR



TURBINE–FLOOR



AUXILIARY–FLOOR



DRAINAGE–GALLERY

LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS C2 – FIRST STAGE CONCRETE C30/37
- CONCRETE CLASS C1 – SECOND STAGE CONCRETE C25/30
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- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES

- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE
- (206) NUMBER OF EL–ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

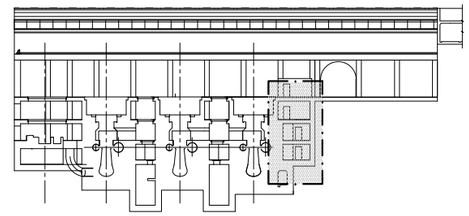
NOTES:

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2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO–ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).
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DRAFT STATUS:
01.11.2018

SCALE 1:200
−2 0 2 4 6 8 10 [m]

KEYPLAN



Reference Drawings

Drwg. No.	Title
31–00053–DD–4344–1410...	POWERHOUSE CAVERN, PLAN AND SECTIONS

Revisions	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	31.07.17
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31–00053–DD–4344–Y–0000_–

CAD– File No.:

DETAILED DESIGN

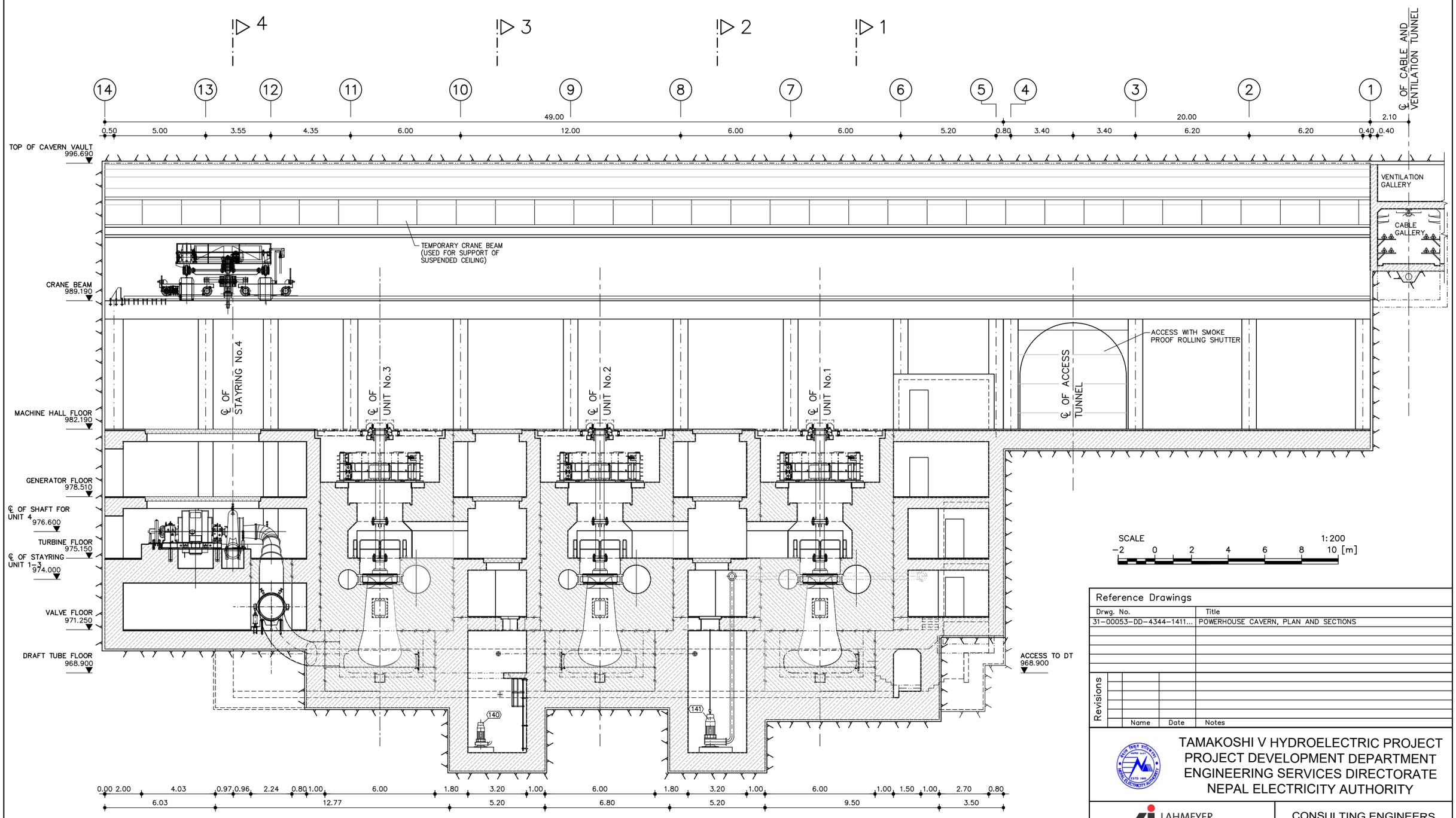
POWER STATION

POWERHOUSE CAVERN

SERVICE BAY
STAIRCASE
SECTIONS
PROJECT DRAWING

Scale A3: 1:200

Drwg. No.: 31–00053–DD–4344–Q 1414 REV. –



LONGITUDINAL SECTION A–A
THROUGH CENTERLINE OF UNITS 1–3

SCALE 1:200
–2 0 2 4 6 8 10 [m]

NOTES:
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LEGEND:
- CONCRETE CLASS C1 – FIRTS STAGE CONCRETE C25/30
- CONCRETE CLASS C2 – FIRST STAGE CONCRETE C30/37
- CONCRETE CLASS C1 – SECOND STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE
- (206) NUMBER OF EL–ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

Reference Drawings

Drwg. No.	Title
31–00053–DD–4344–1411...	POWERHOUSE CAVERN, PLAN AND SECTIONS

Revisions

Name	Date	Notes

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PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	31.07.17
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No: 31–00053–DD–4344–Y–0000_–

CAD– File No.:

Scale A3: 1:200

DETAILED DESIGN

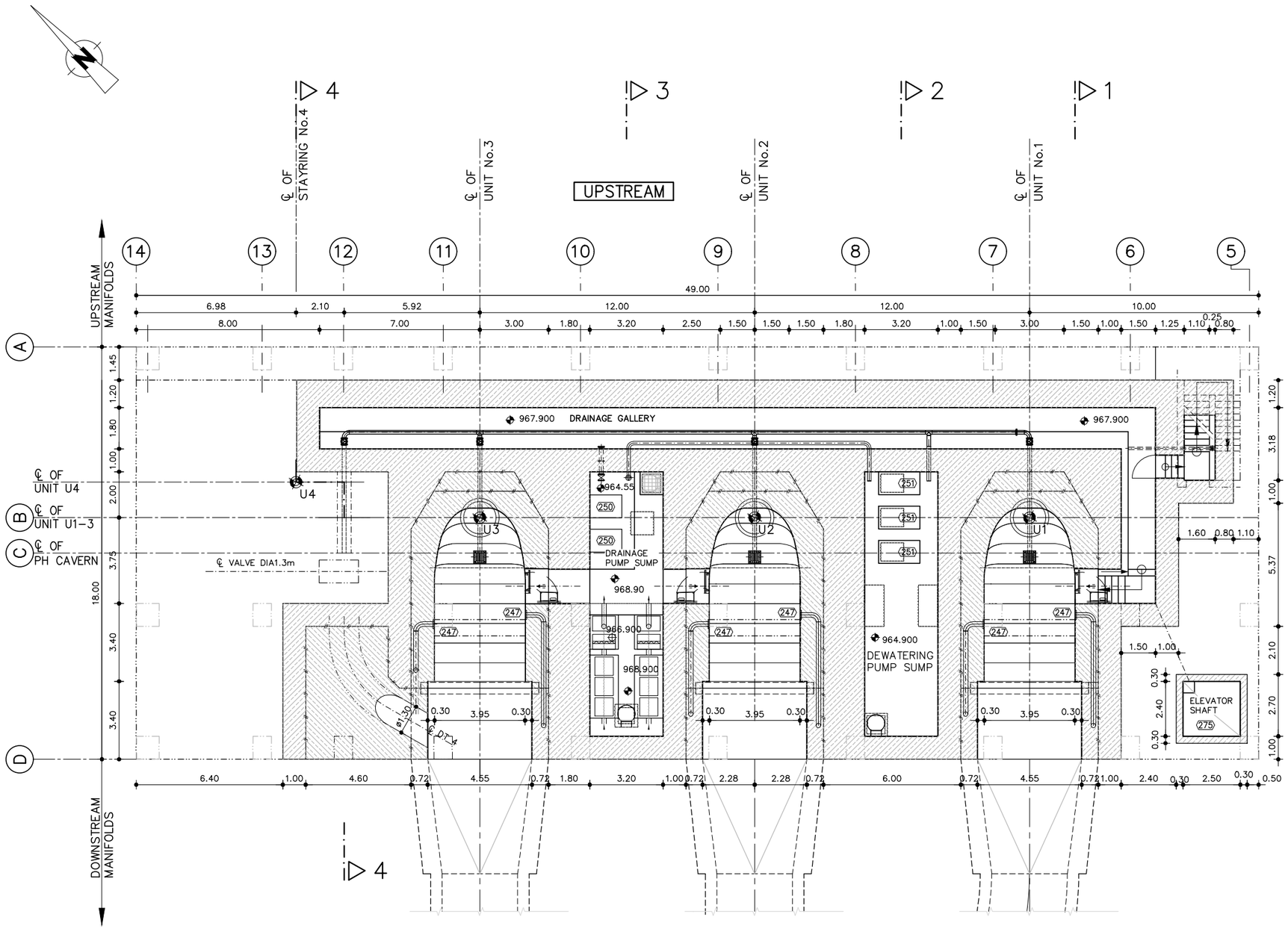
POWER STATION

POWERHOUSE CAVERN

LONGITUDINAL SECTION THROUGH ℄ OF UNITS 1–3

PROJECT DRAWING

Drwg. No.: 31–00053–DD–4344–Q 1415 REV. –



DOWNSTREAM

DRAFT TUBE FLOOR
LEVEL 968.900

LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS C2 – FIRST STAGE CONCRETE C30/37
- CONCRETE CLASS C1 – SECOND STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- ⊕ ▽ UNFINISHED TOP OF SLAB
- ◆ ▼ FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE
- (206) NUMBER OF EL–ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

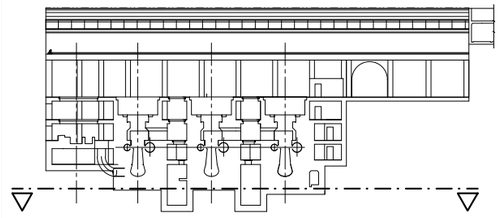
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DRAFT STATUS:
01.11.2018

SCALE 1:200
−2 0 2 4 6 8 10 [m]

KEYPLAN



Reference Drawings

Drwg. No.	Title
31–00053–DD–4344–1410...	POWERHOUSE CAVERN, PLAN AND SECTIONS

Revisions	Name	Date	Notes

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NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
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BAD VILBEL, GERMANY

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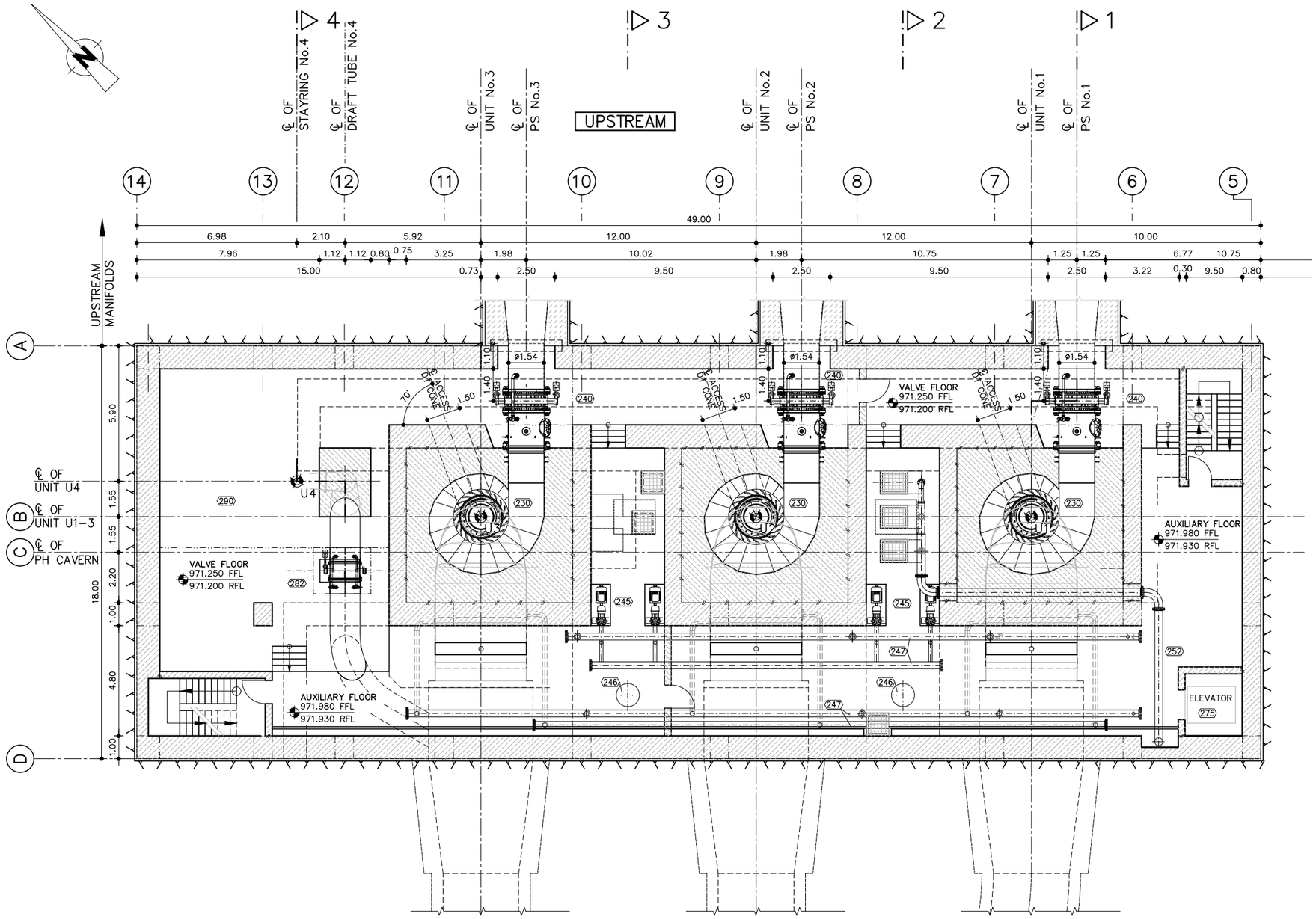
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31–00053–DD–4344–Y–0000_–

CAD– File No.:

Scale A3: 1:200

DETAILED DESIGN
POWER STATION
POWERHOUSE CAVERN
DRAFT TUBE FLOOR
EL. 968.900
PLAN
PROJECT DRAWING

Drwg. No.: 31–00053–DD–4344–Q 1416 REV. –



VALVE FLOOR/ AUXILIARY FLOOR
LEVEL 971.250

LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS C2 – FIRST STAGE CONCRETE C30/37
- CONCRETE CLASS C1 – SECOND STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
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- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE
- (206) NUMBER OF EL–ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

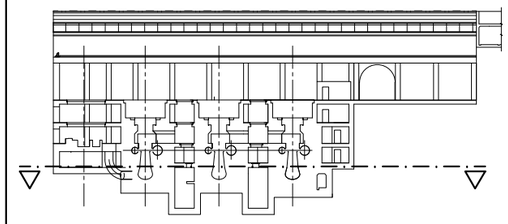
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DRAFT STATUS:
01.11.2018

SCALE 1:200
–2 0 2 4 6 8 10 [m]

KEYPLAN



Reference Drawings

Drwg. No.	Title
31–00053–DD–4344–1410...	POWERHOUSE CAVERN, PLAN AND SECTIONS

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	31.07.17
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31–00053–DD–4344–Y–0000_–

CAD– File No.:

Scale A3: 1:200

DETAILED DESIGN

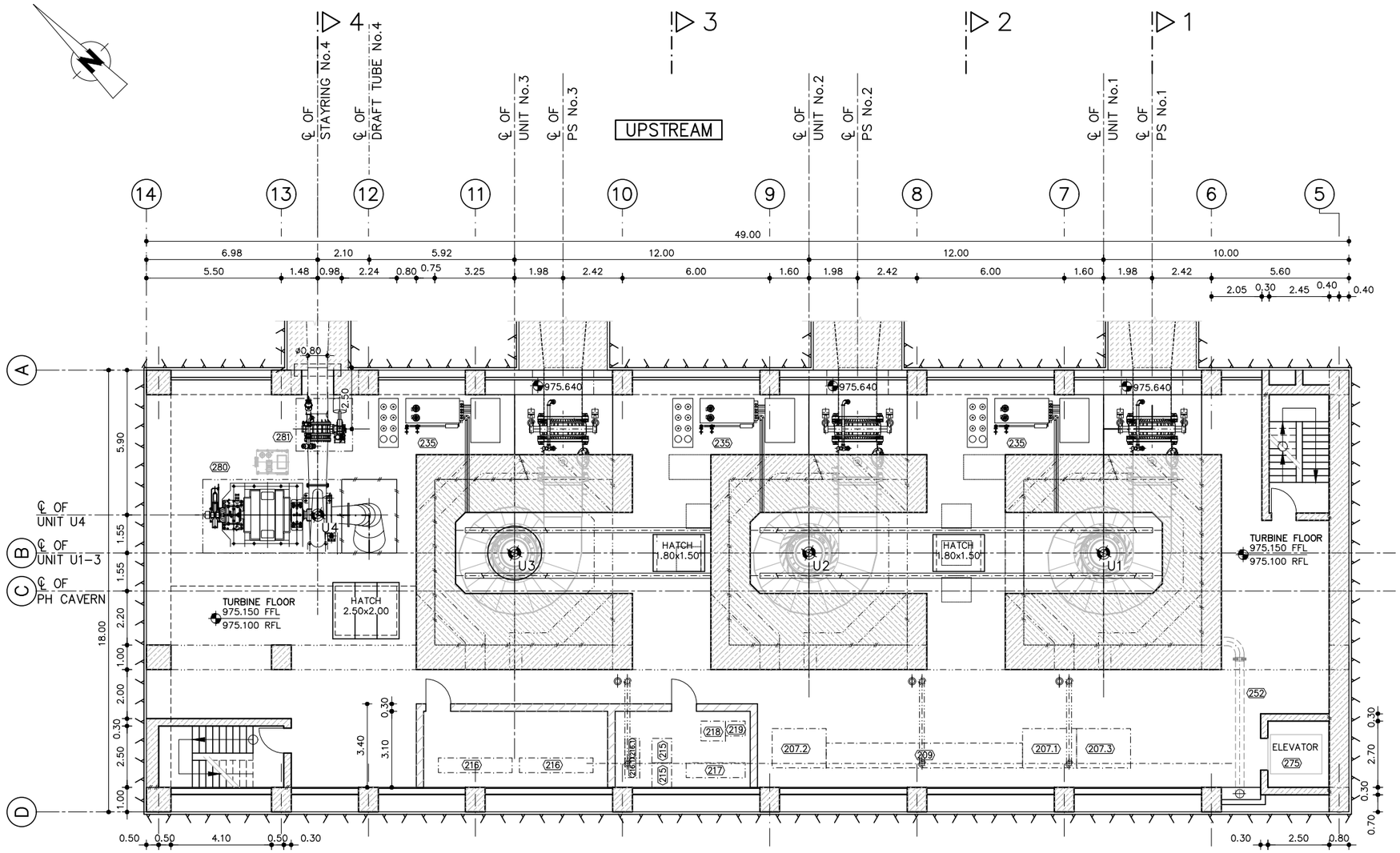
POWER STATION

POWERHOUSE CAVERN

VALVE FLOOR
EL. 971.250
PLAN

PROJECT DRAWING

Drwg. No.: 31–00053–DD–4344– Q 1417 REV. –



DOWNSTREAM

TURBINE FLOOR
LEVEL 975.150

LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS C2 – FIRST STAGE CONCRETE C30/37
- CONCRETE CLASS C1 – SECOND STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE
- (206) NUMBER OF EL–ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

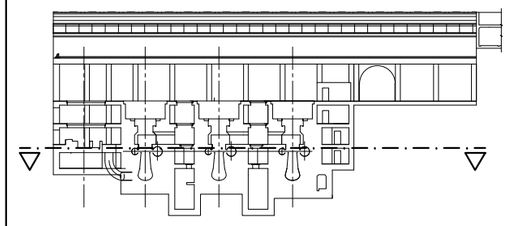
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DRAFT STATUS:
01.11.2018

SCALE 1:200
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KEYPLAN



Reference Drawings

Drwg. No.	Title
31–00053–DD–4344–1410...	POWERHOUSE CAVERN, PLAN AND SECTIONS

Revisions	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	31.07.17
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31–00053–DD–4344–Y–0000_–

CAD– File No.:

DETAILED DESIGN

POWER STATION

POWERHOUSE CAVERN

TURBINE FLOOR
EL. 975.150
PLAN

PROJECT DRAWING

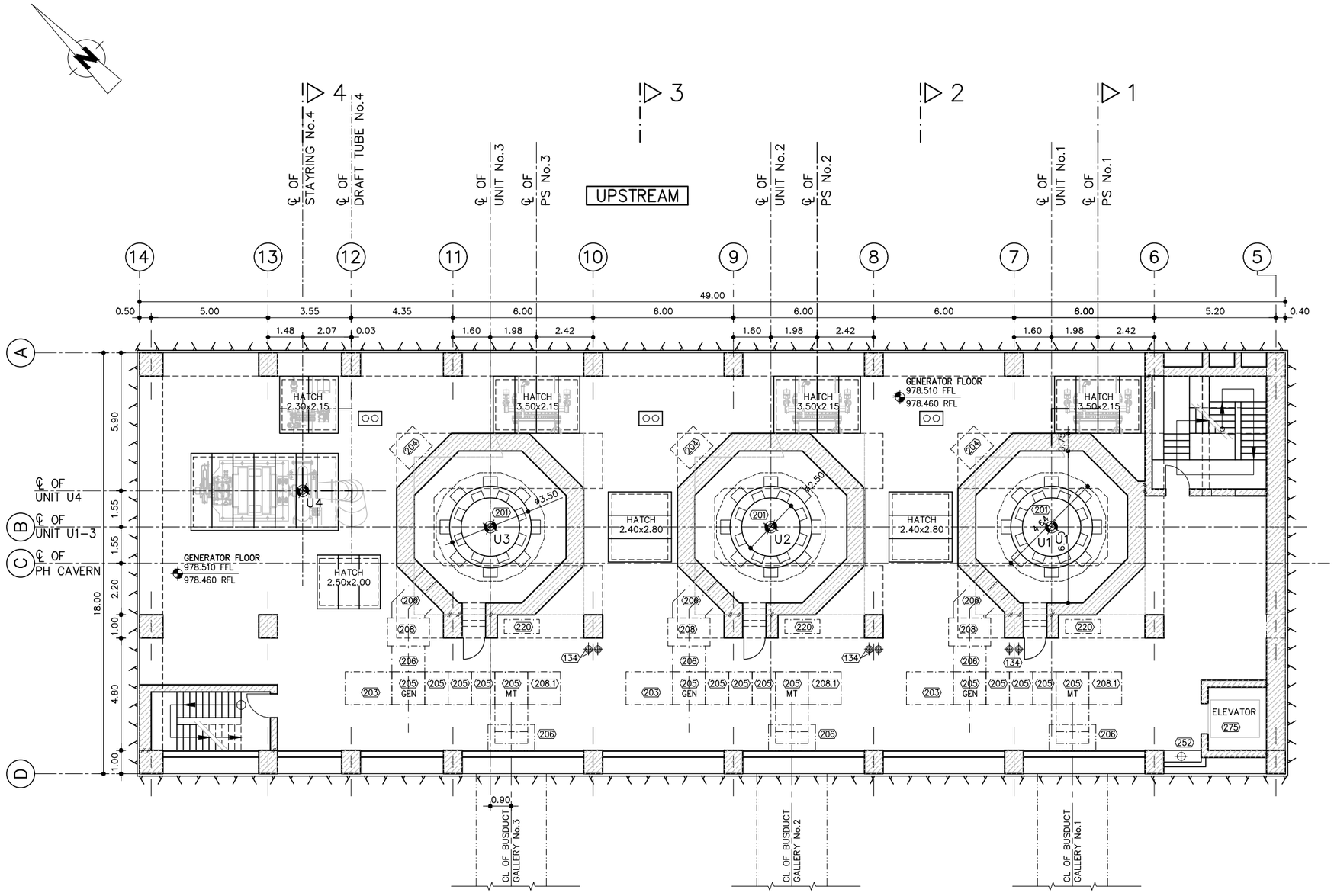
Scale A3: 1:200

Drwg. No.: 31–00053–DD–4344–Q 1418 REV. –

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
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DRAFT STATUS:
01.11.2018



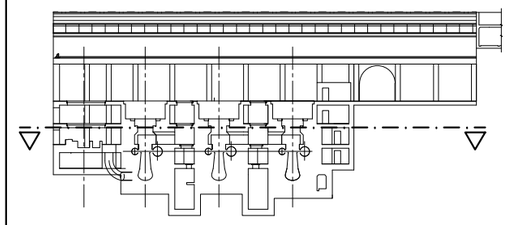
LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS C2 – FIRST STAGE CONCRETE C30/37
- CONCRETE CLASS C1 – SECOND STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
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- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT-COORDINATE
- (206) NUMBER OF EL-ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

GENERATOR FLOOR
LEVEL 978.510

SCALE 1:200
−2 0 2 4 6 8 10 [m]

KEYPLAN



Reference Drawings

Drwg. No.	Title
31-00053-DD-4344-1410...	POWERHOUSE CAVERN, PLAN AND SECTIONS

Revisions

	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

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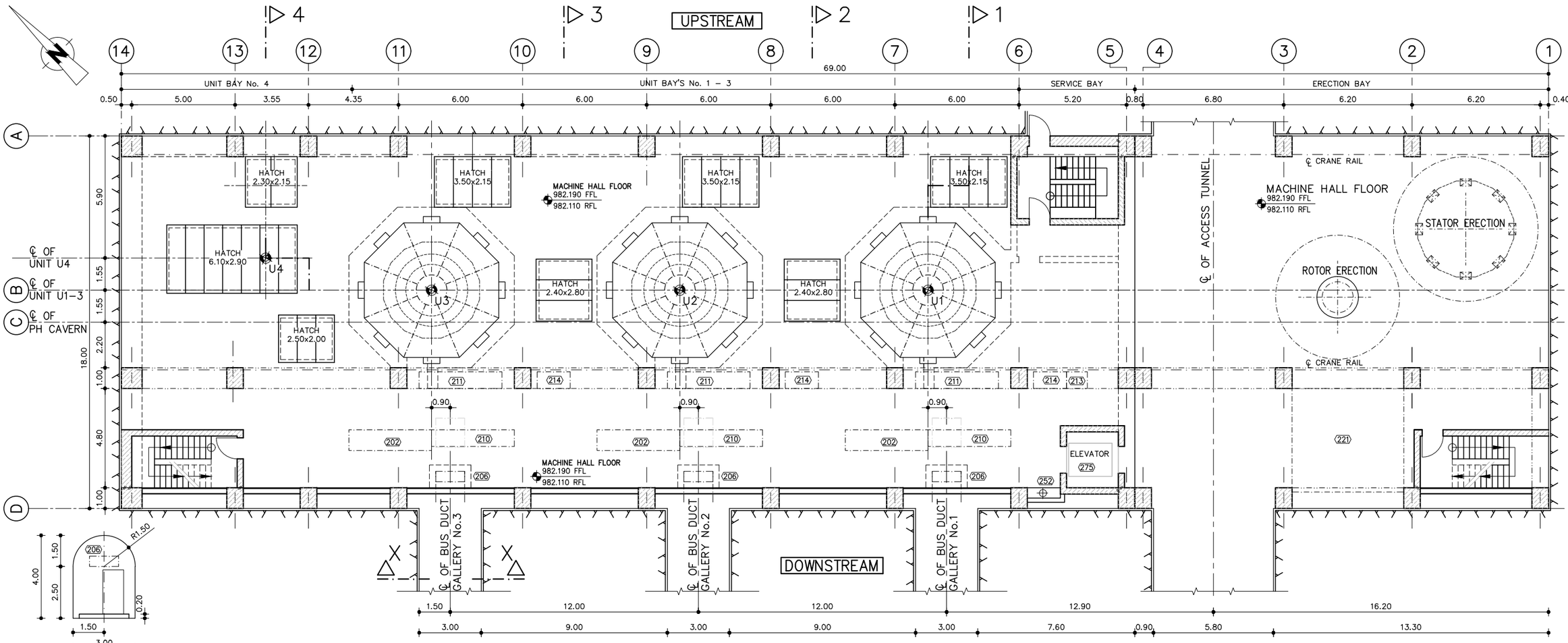
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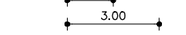
CAD- File No.:

DETAILED DESIGN
POWER STATION
POWERHOUSE CAVERN
GENERATOR FLOOR
EL. 978.510
PLAN
PROJECT DRAWING

Scale A3: 1:200

Drwg. No.: 31-00053-DD-4344-Q 1419 REV. -





MACHINE HALL FLOOR
LEVEL 982.190

DRAFT STATUS:
01.11.2018

NOTES:

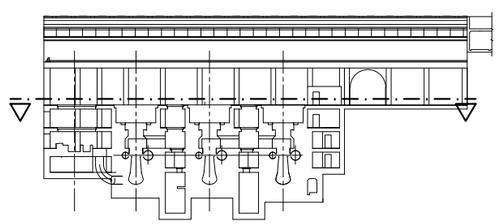
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LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
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SCALE 1: 200
–2 0 2 4 6 8 10 [m]

KEYPLAN



Reference Drawings

Drwg. No.	Title
31–00053–DD–4344–1410...	POWERHOUSE CAVERN, PLAN AND SECTIONS

Revisions		Name	Date	Notes

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LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

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Checked	Roloff	
Approved	Dr. Moeller	

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CAD– File No.:

Scale A3: 1: 200

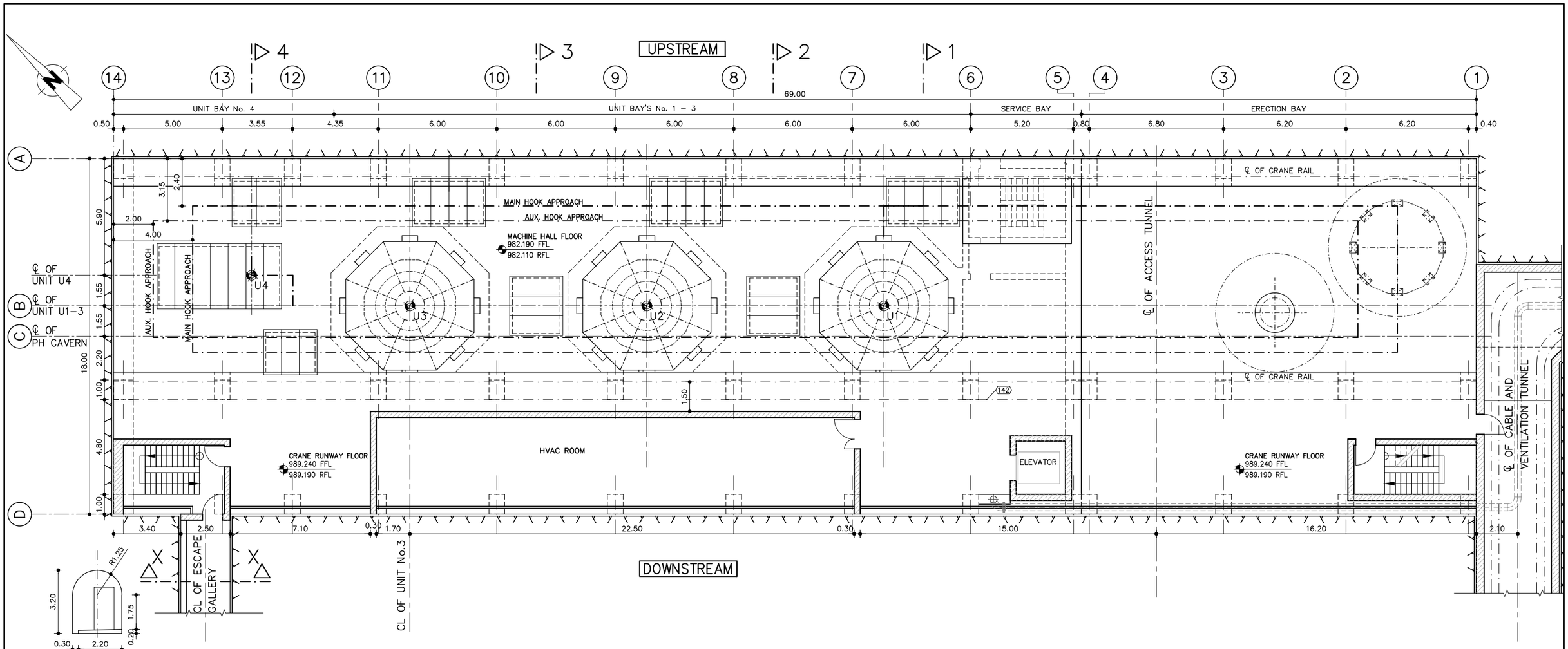
DETAILED DESIGN

POWER STATION

POWERHOUSE CAVERN

MACHINE HALL FLOOR
EL. 982.190
PLAN
PROJECT DRAWING

Drwg. No.: 31–00053–DD–4344–Q 1420 REV. –



SECTION X–X
ESCAPE GALLERY

CRANE RUNWAY FLOOR
LEVEL 989.240

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
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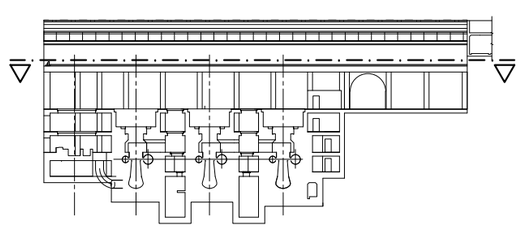
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- (R 206) ROOM NUMBER

DRAFT STATUS:
01.11.2018

SCALE 1:200
–2 0 2 4 6 8 10 [m]

KEYPLAN



Reference Drawings

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31–00053–DD–4344–1410...	POWERHOUSE CAVERN, PLAN AND SECTIONS

Revisions

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PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	31.07.17
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31–00053–DD–4344–Y–0000_–

CAD– File No.:

DETAILED DESIGN

POWER STATION

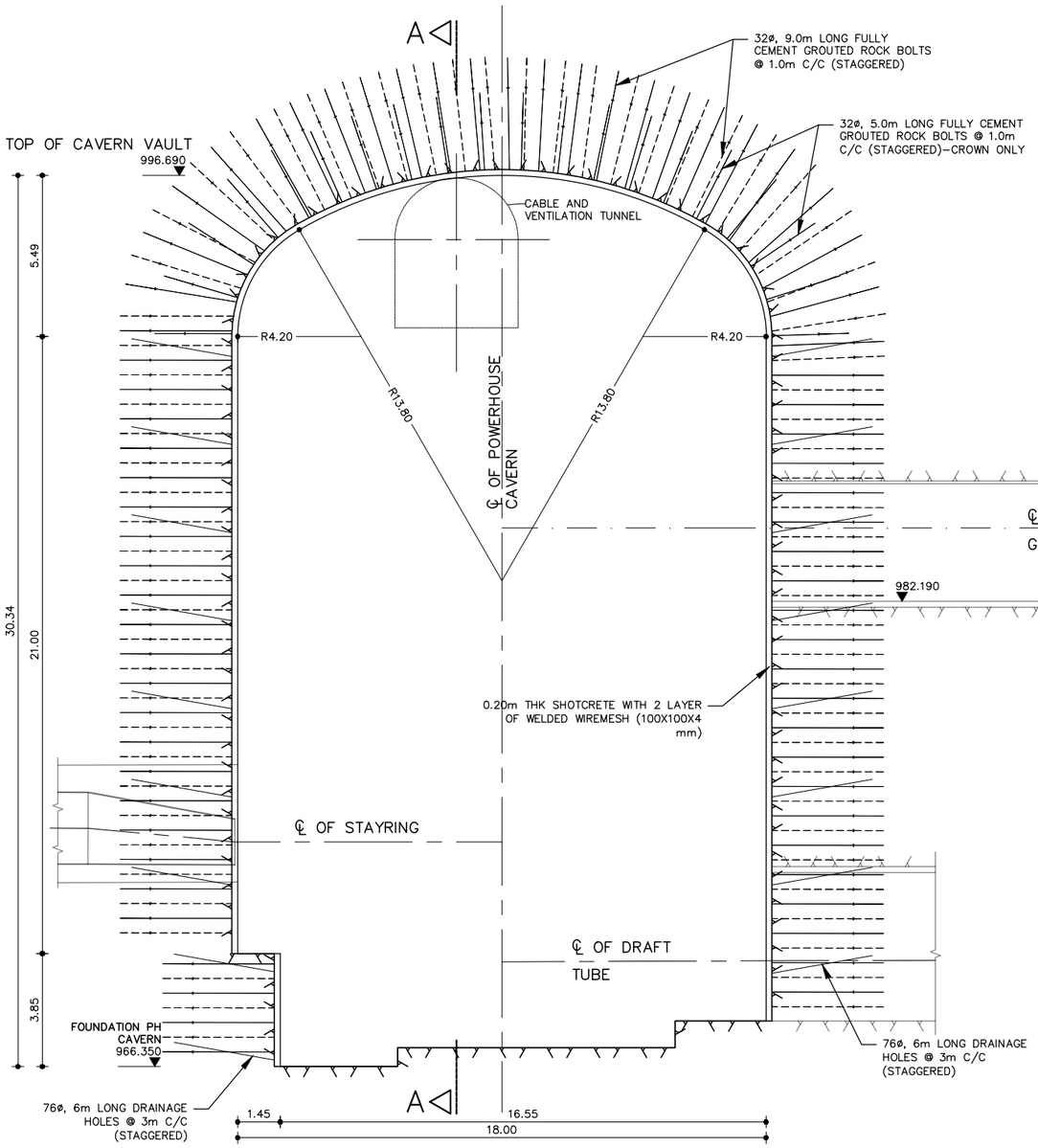
POWERHOUSE CAVERN

CRANE RUNWAY FLOOR
EL. 989.240
PLAN

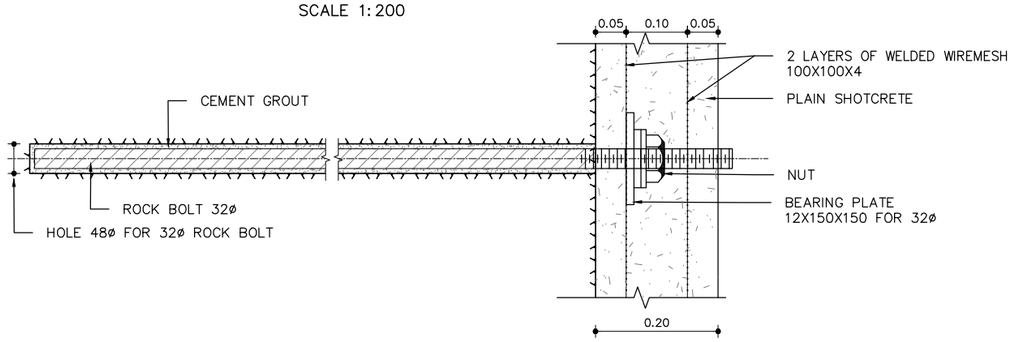
PROJECT DRAWING

Scale A3: 1:200

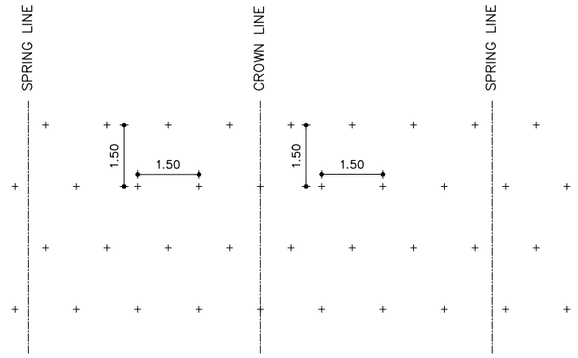
Drwg. No.: 31–00053–DD–4344–Q 1421 REV. –



TYPICAL DETAILS OF SUPPORT SYSTEM
POWERHOUSE CAVERN
SCALE 1:200



TYPICAL ROCK BOLT AND SHOTCRETE DETAILS
NOT TO SCALE



TYPICAL DETAILS OF ROCK BOLTS IN CROWN
(DEVELOPED VIEW)

NOTES ON ROCKSUPPORT:

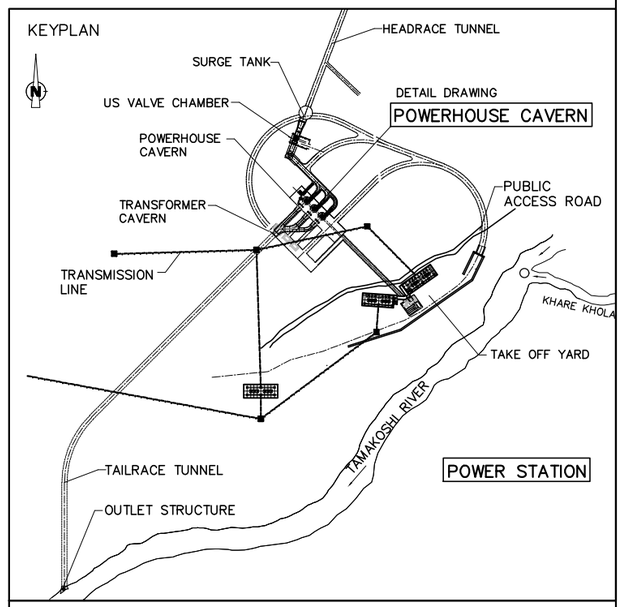
1. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
2. ALL SHOTCRETE SHALL BE PLAIN SHOTCRETE.
3. FULLY CEMENT GROUTED ROCK BOLTS SHALL HAVE THE FOLLOWING CHARACTERISTICS:
 - DIA. 32 MM
 - YIELD STRENGTH 500 N/MM²
 - MAXIMUM TENSILE CAPACITY 349 KN
4. ROCK SUPPORT MEASURES SHOWN ON THIS DRAWING ARE PRELIMINARY ONLY. FINAL ARRANGEMENT OF ROCK SUPPORT (SHOTCRETE THICKNESSES; LENGTH, ORIENTATION AND GRID OF ROCK BOLTS) HAVE TO BE ADOPTED TO ACTUAL GEOTECHNICAL CONDITIONS, SUBJECT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR.
5. 10 NOS. PRESTRESSED ROCK ANCHORS WITH A LENGTH OF 20 M AND A WORKING LOAD OF 1,000 KN HAVE TO BE AVAILABLE ON SITE FOR UNEXPECTED GEOTECHNICAL CONDITIONS.
6. INTERSECTING TUNNELS ON THE LAST 12M BEFORE ENTERING THE CHAMBER SHALL BE SUPPORTED 1 RS HIGHER THAN WOULD BE APPLICABLE ACCORDING TO THE GEOLOGY.
7. ROCKSUPPORT ON THE PERIPHERY OF INTERSECTING TUNNEL DEPENDS ON SEQUENCE OF EXCAVATION AND SHALL BE MODIFIED BY THE ENGINEER AT SITE PRIOR APPLYING.

DRAFT STATUS:
27.09.2018

NOTES:
1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].

NOTES DRAIN HOLES:
1. DRAIN HOLES SHALL BE DRILLED AFTER INSTALLATION OF BOLTS
2. DRAIN HOLES L=6.00 m, INCLINED 5°. DIA ø76 mm
3. DRAIN HOLE SHALL BE EQUIPPED WITH SUITABLE FILTER PIPES (SLOTTED PVC PIPES WRAPPED WITH GEOTEXTILE)
4. PATTERN 9 m2 (3.00 BY 3.00).
5. DRAIN HOLE PATTERN MAY BE ADJUSTED ON SITE TO SUIT WATER INFLOW FROM PARTICULARLY PERMEABLE ROCK STRATA. DRAIN HOLES IN THE CAVERN VAULT SHALL BE ALIGNED VERTICALLY, TO ALLOW FOR DIRECT CONNECTION OF VERTICAL COLLECTING PIPES.

SCALE 1:200
−2 0 2 4 6 8 10 [m]



Reference Drawings

Drwg. No.	Title
31–00053–DD–4300–Q–1402	POWER STATION–CAVERN–PLAN

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	R. Shrivastava	27.09.18
Drawn	A. K. Basu	27.09.18
Checked	Roloff	27.09.18
Approved	Dr. Moeller	27.09.18

Replaces Drwg. No: 31–00053–DD–4344–Y–0000_–

CAD– File No.:

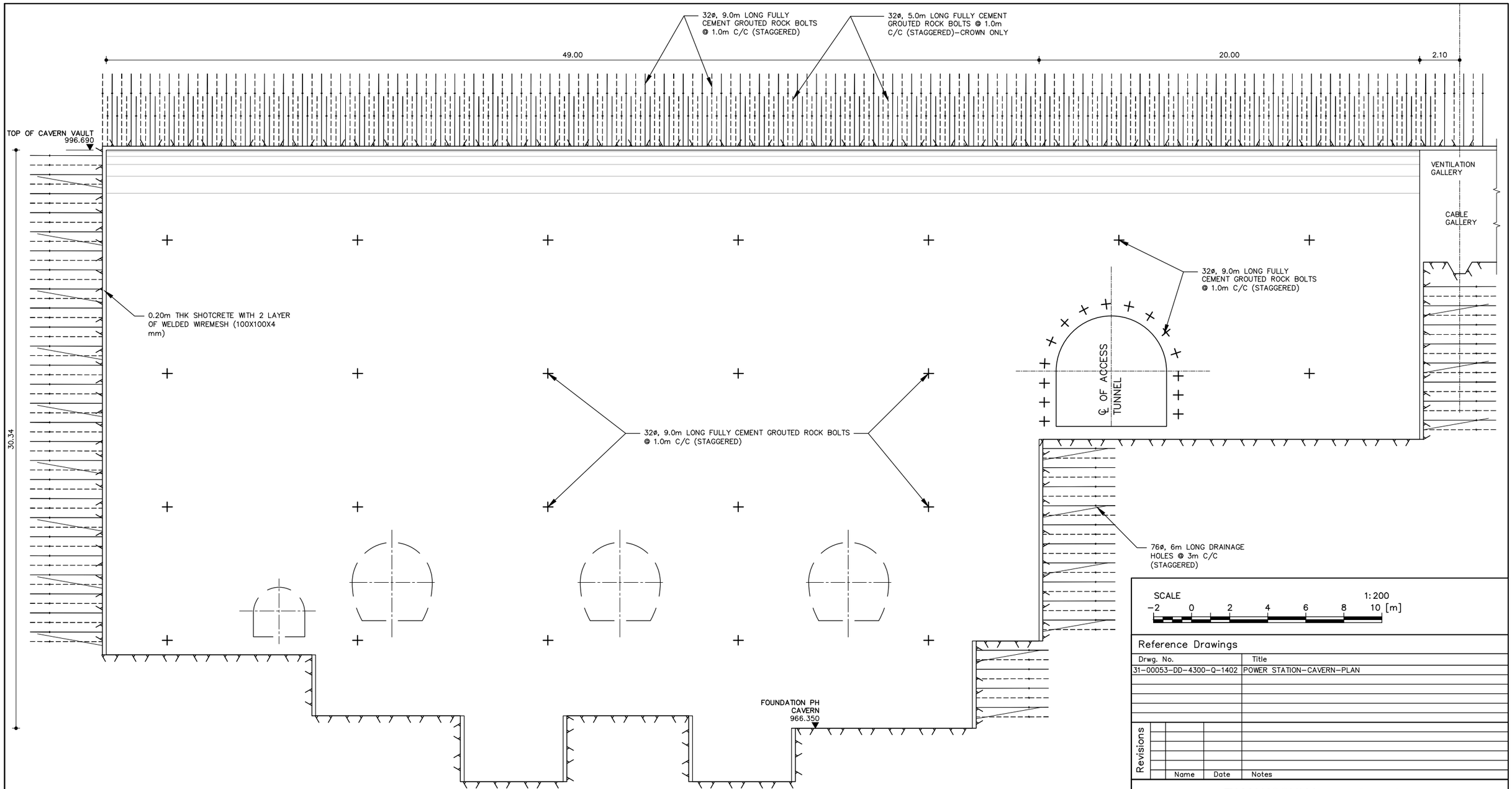
Scale A3: 1:200

DETAILED DESIGN

POWER STATION
POWERHOUSE CAVERN
EXCAVATION AND ROCK SUPPORT DETAIL

PROJECT DRAWING

Drwg. No.: 31–00053–DD–4344– S 1425 REV. –



LONGITUDINAL SECTION A–A
THROUGH CENTERLINE OF UNITS 1–3

SCALE 1:200
−2 0 2 4 6 8 10 [m]

NOTES ON ROCKSUPPORT:

1. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
2. ALL SHOTCRETE SHALL BE PLAIN SHOTCRETE.
3. FULLY CEMENT GROUTED ROCK BOLTS SHALL HAVE THE FOLLOWING CHARACTERISTICS:
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7. ROCKSUPPORT ON THE PERIPHERY OF INTERSECTING TUNNEL DEPENDS ON SEQUENCE OF EXCAVATION AND SHALL BE MODIFIED BY THE ENGINEER AT SITE PRIOR APPLYING.

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].

NOTES DRAIN HOLES:

1. DRAIN HOLES SHALL BE DRILLED AFTER INSTALLATION OF BOLTS
2. DRAIN HOLES L=6.00 m, INCLINED 5°. DIA ø76 mm
3. DRAIN HOLE SHALL BE EQUIPPED WITH SUITABLE FILTER PIPES (SLOTTED PVC PIPES WRAPPED WITH GEOTEXTILE)
4. PATTERN 9 m2 (3.00 BY 3.00).
5. DRAIN HOLE PATTERN MAY BE ADJUSTED ON SITE TO SUIT WATER INFLOW FROM PARTICULARLY PERMEABLE ROCK STRATA. DRAIN HOLES IN THE CAVERN VAULT SHALL BE ALIGNED VERTICALLY, TO ALLOW FOR DIRECT CONNECTION OF VERTICAL COLLECTING PIPES.

DRAFT STATUS: 27.09.2018

Reference Drawings

Drwg. No.	Title
31–00053–DD–4300–Q–1402	POWER STATION–CAVERN–PLAN

Revisions	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
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BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

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Prepared	R. Shrivastava	27.09.18
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Checked	Roloff	27.09.18
Approved	Dr. Moeller	27.09.18

Replaces Drwg. No: 31–00053–DD–4344–Y–0000_–

CAD– File No.:

Scale A3: 1:200

DETAILED DESIGN

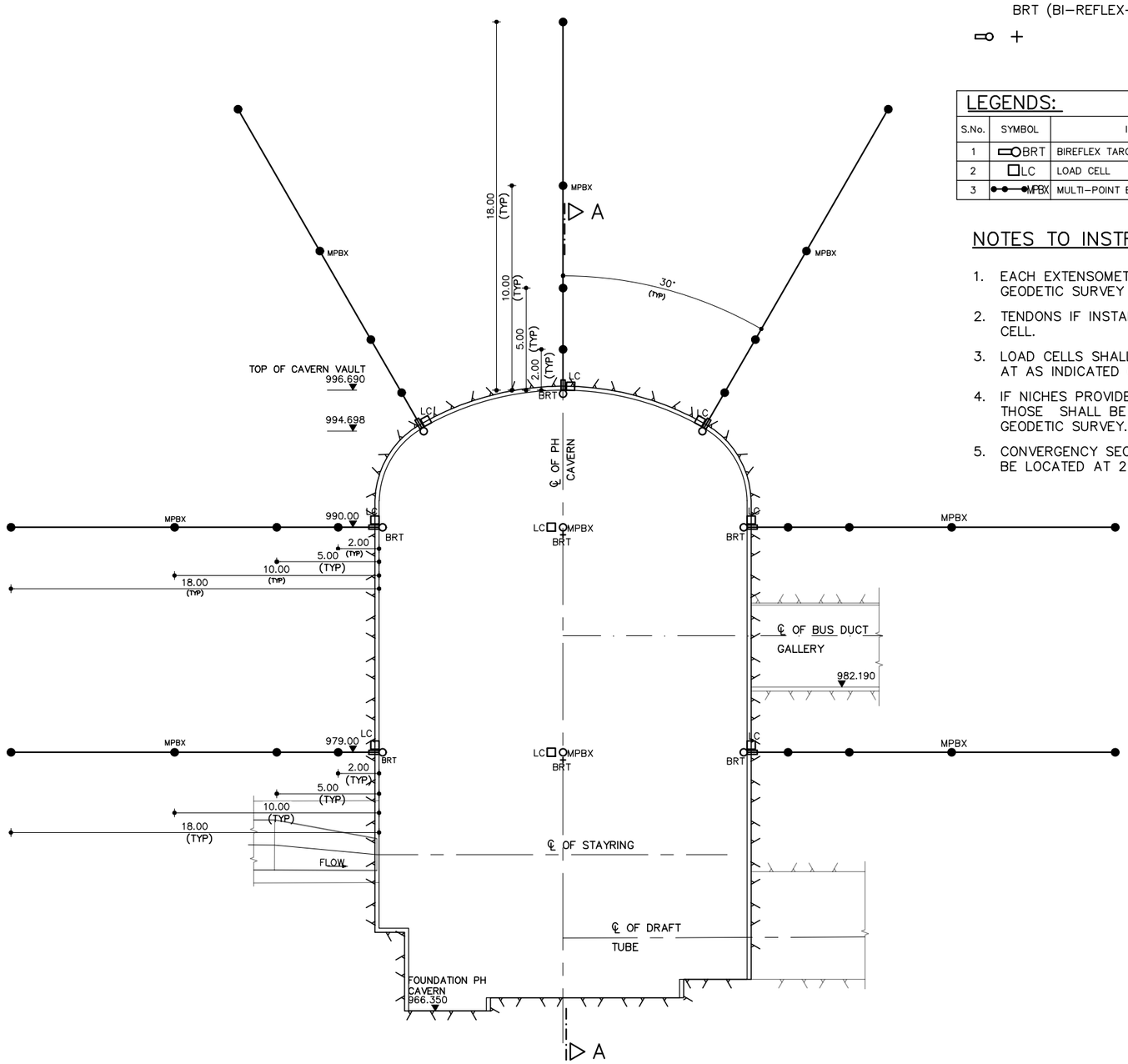
POWER STATION

POWERHOUSE CAVERN

LONGITUDINAL SECTION A–A
EXCAVATION AND ROCK SUPPORT DETAIL

PROJECT DRAWING

Drwg. No.: 31–00053–DD–4344– S 1426 | REV. –



TYPICAL INSTRUMENTATION DETAILS
POWERHOUSE CAVERN
SCALE 1:250

LEGEND:

MULTI–POINT BOREHOLE EXTENSOMETER

MPBX

ANCHOR LOAD CELL

LC

BRT (BI–REFLEX–TARGET)

LEGENDS:

S.No.	SYMBOL	INSTRUMENT	POWERHOUSE CAVERN
1	BRT	BIREFLEX TARGET	23
2	LC	LOAD CELL	23
3	MPBX	MULTI–POINT BOREHOLE EXTENSOMETER	23

NOTES TO INSTRUMENTATION:

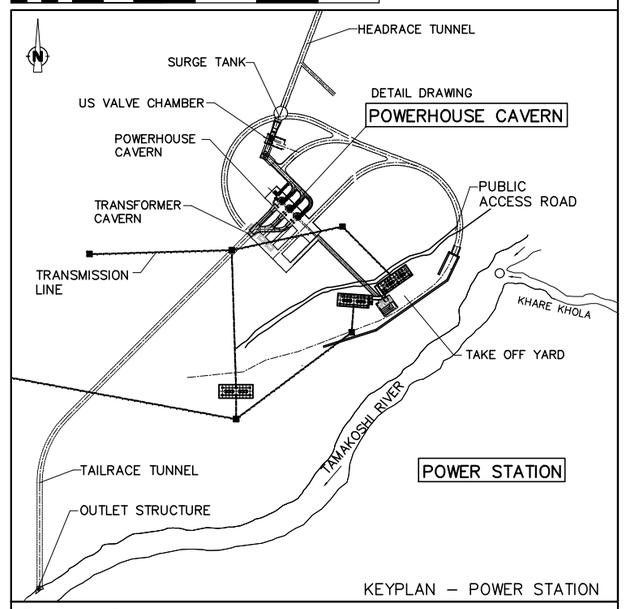
1. EACH EXTENSOMETER HEAD SHALL BE EQUIPPED WITH A GEODETIC SURVEY POINT.
2. TENDONS IF INSTALLED SHALL BE EQUIPPED WITH A LOAD CELL.
3. LOAD CELLS SHALL BE INSTALLED ON ANCHORS THAT ARE AT AS INDICATED OR NEAR THE MONITORING SECTIONS.
4. IF NICHES PROVIDED FOR EXTENSOMETER AT FACE WALLS THOSE SHALL BE EQUIPPED WITH A BEACON TO ALLOW GEODETIC SURVEY.
5. CONVERGENCY SECTIONS AT INTERSECTING TUNNELS SHALL BE LOCATED AT 2 m DISTANCE.

DRAFT STATUS:
27.09.2018

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CABLE FROM INDIVIDUAL INSTRUMENTS AT DIFFERENT LOCATIONS WILL BE CONNECTED TO SWITCH BOXES FOR OBSERVING DATA.
4. CABLES WILL BE PROVIDED IN CONDUITS AND PROTECTIVE COVER WILL BE PROVIDED FOR INSTRUMENTS.
5. FOR POWERHOUSE CAVERN, INSTRUMENT ARE TO BE PROPOSED AT THREE CROSS SECTION ie. AT CENTRE AND AT 5m DISTANCE FROM EACH GABLE END INSIDE POWERHOUSE CAVERN.
6. FOR POWERHOUSE TWO SETS OF INSTRUMENT ON EACH GABLE END ARE ALSO PROPOSED.

SCALE 1:250
–2.5 0 2.5 5 7.5 10 12.5 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
::::::::	::::::::::::

Revisions

	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	R. Shrivastava	27.09.18
Drawn	A. K. Basu	27.09.18
Checked	Roloff	27.09.18
Approved	Dr. Moeller	27.09.18

Replaces Drwg. No:
31–00053–DD–4344–Y–0000_–

CAD– File No.:

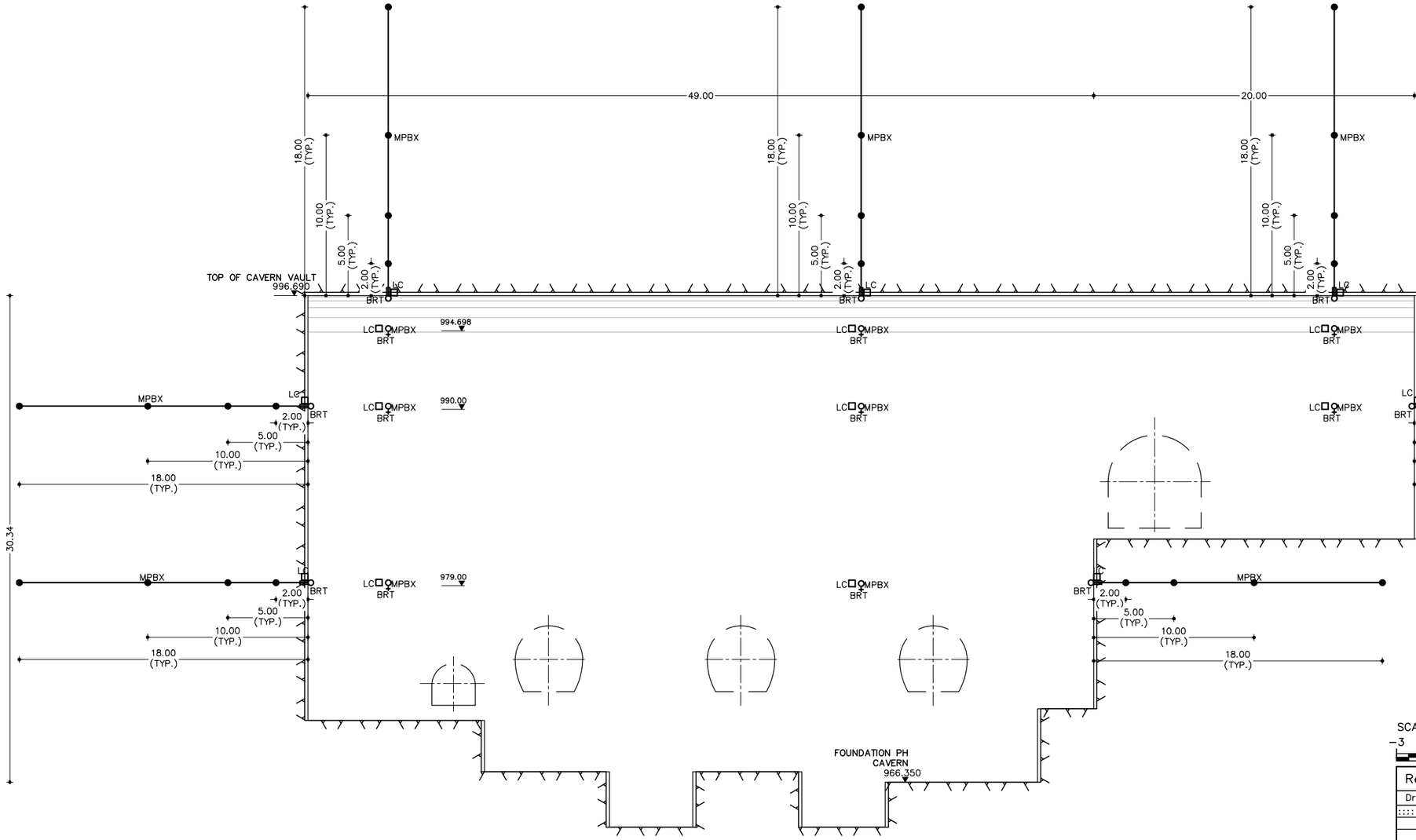
Scale A3: 1:250

DETAILED DESIGN

POWER STATION
POWERHOUSE CAVERN

INSTRUMENTATION DETAILS
PROJECT DRAWING

Drwg. No.: 31–00053–DD–4344– S 1427 REV. –



LONGITUDINAL SECTION A–A
THROUGH CENTERLINE OF UNITS 1–3

LEGEND:

MULTI–POINT BOREHOLE EXTENSOMETER

ANCHOR LOAD CELL

BRT (BI–REFLEX–TARGET)

SCALE 1:300
–3 0 3 6 9 12 15 [m]

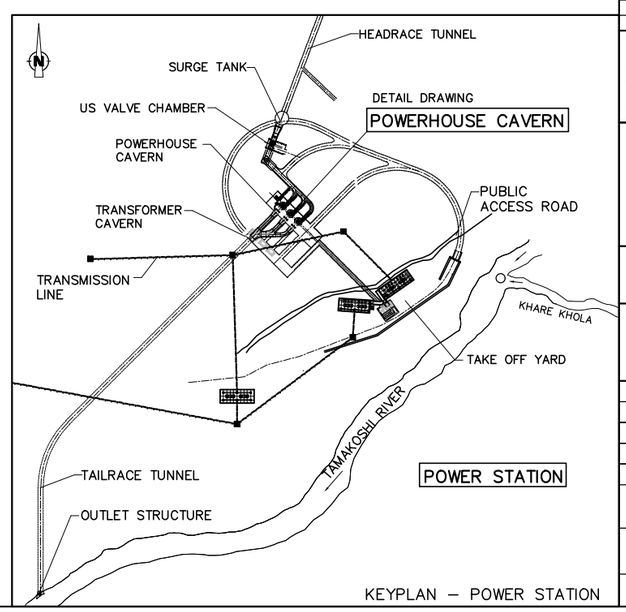
DRAFT STATUS: 27.09.2018

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CABLE FROM INDIVIDUAL INSTRUMENTS AT DIFFERENT LOCATIONS WILL BE CONNECTED TO SWITCH BOXES FOR OBSERVING DATA.
4. CABLES WILL BE PROVIDED IN CONDUITS AND PROTECTIVE COVER WILL BE PROVIDED FOR INSTRUMENTS.
5. FOR POWERHOUSE CAVERN, INSTRUMENT ARE TO BE PROPOSED AT THREE CROSS SECTION ie. AT CENTRE AND AT 5m DISTANCE FROM EACH GABLE END INSIDE POWERHOUSE CAVERN.
6. FOR POWERHOUSE TWO SETS OF INSTRUMENT ON EACH GABLE END ARE ALSO PROPOSED.

NOTES TO INSTRUMENTATION:

1. EACH EXTENSOMETER HEAD SHALL BE EQUIPPED WITH A GEODETIC SURVEY POINT.
2. TENDONS IF INSTALLED SHALL BE EQUIPPED WITH A LOAD CELL.
3. LOAD CELLS SHALL BE INSTALLED ON ANCHORS THAT ARE AT AS INDICATED OR NEAR THE MONITORING SECTIONS.
4. IF NICHES PROVIDED FOR EXTENSOMETER AT FACE WALLS THOSE SHALL BE EQUIPPED WITH A BEACON TO ALLOW GEODETIC SURVEY.
5. CONVERGENCY SECTIONS AT INTERSECTING TUNNELS SHALL BE LOCATED AT 2 m DISTANCE.



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
:::::::::	::::::::::::

Revisions

	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	R. Shrivastava	27.09.18
Drawn	A. K. Basu	27.09.18
Checked	Roloff	27.09.18
Approved	Dr. Moeller	27.09.18

Replaces Drwg. No:
31–00053–DD–4344–Y–0000_–

CAD– File No.:

Scale A3: 1:300

DETAILED DESIGN

POWER STATION

POWERHOUSE CAVERN

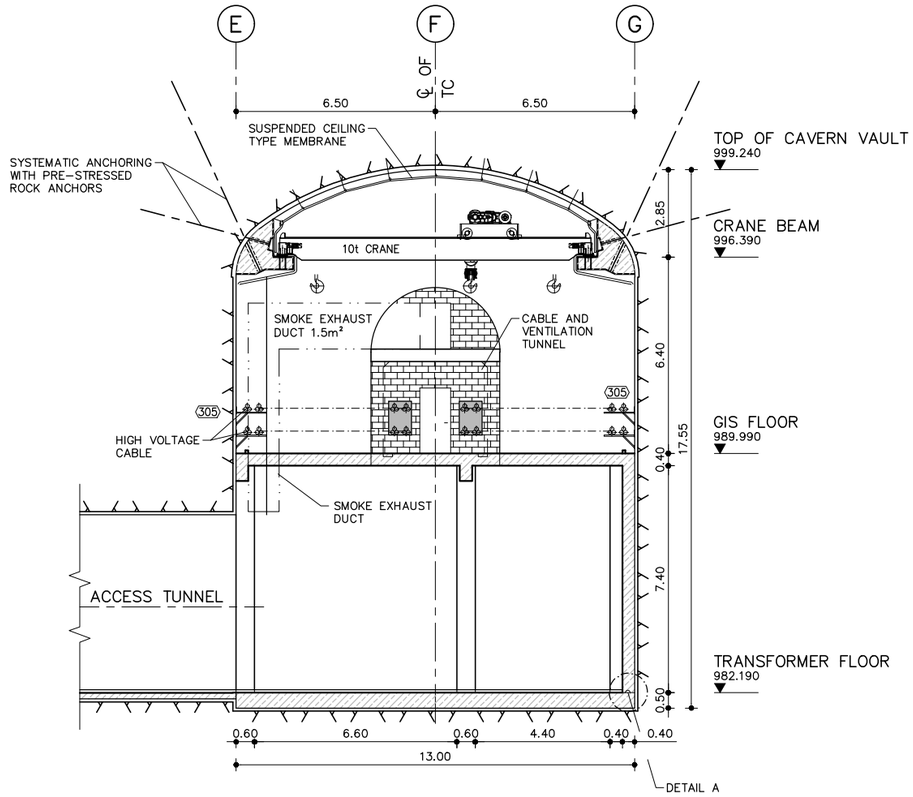
LONGITUDINAL SECTION A–A
INSTRUMENTATION DETAILS

PROJECT DRAWING

Drwg. No.: 31–00053–DD–4344– S 1428 REV. –

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO-ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).
4. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
5. ROCK SUPPORT MEASURES NOT SHOWN.
6. ROCK DRAINAGE SYSTEM WITH SYSTEMATIC DRAIN HOLES NOT SHOWN.

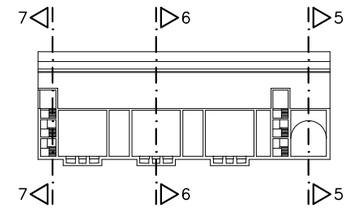


DRAFT STATUS:
27.09.2018

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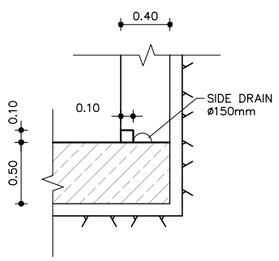
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−2 0 2 4 6 8 10 [m]

KEYPLAN



LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT-COORDINATE
- (206) NUMBER OF EL-ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER



DETAIL A
SCALE 1:50

Reference Drawings

Drwg. No.	Title
31-00053-DD-4300-1400	POWER STATION, LAYOUT

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.08.18
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:

CAD- File No.:

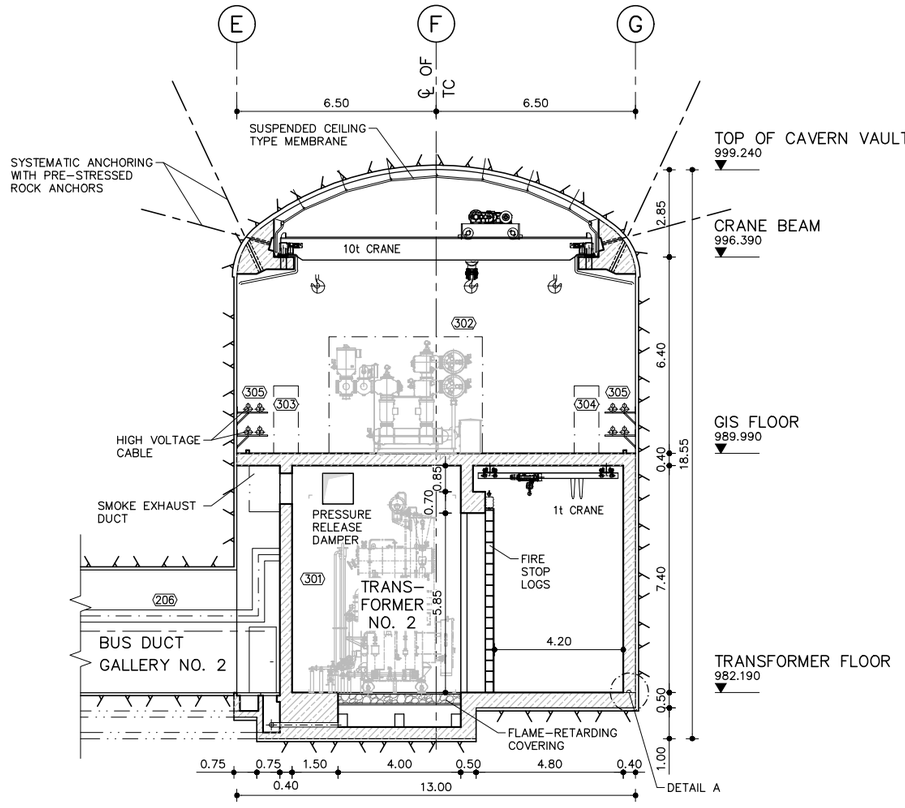
DETAILED DESIGN

POWER STATION
TRANSFORMER CAVERN
CROSS SECTION 5-5

PROJECT DRAWING

Scale A3: 1:200, 1:50

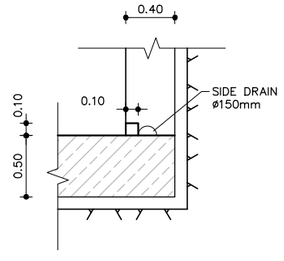
Drwg. No.: 31-00053-DD-4384-Q 1430 REV. —



SECTION 6-6

LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT-COORDINATE
- (206) NUMBER OF EL-ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER



DETAIL A
SCALE 1:50

NOTES:

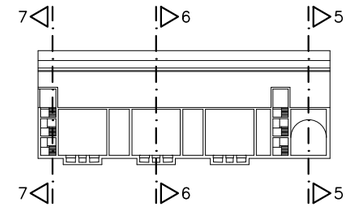
1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO-ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).
4. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
5. ROCK SUPPORT MEASURES NOT SHOWN.
6. ROCK DRAINAGE SYSTEM WITH SYSTEMATIC DRAIN HOLES NOT SHOWN.

DRAFT STATUS:
27.09.2018

SCALE 1:50
−0.5 0 0.5 1 1.5 2 2.5 [m]

SCALE 1:200
−2 0 2 4 6 8 10 [m]

KEYPLAN



Reference Drawings

Drwg. No.	Title
31-00053-DD-4300-1400	POWER STATION, LAYOUT

Revisions	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

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Prepared	B. Khadka	31.08.18
Drawn	B. Khadka	
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Approved	Dr. Moeller	

Replaces Drwg. No:

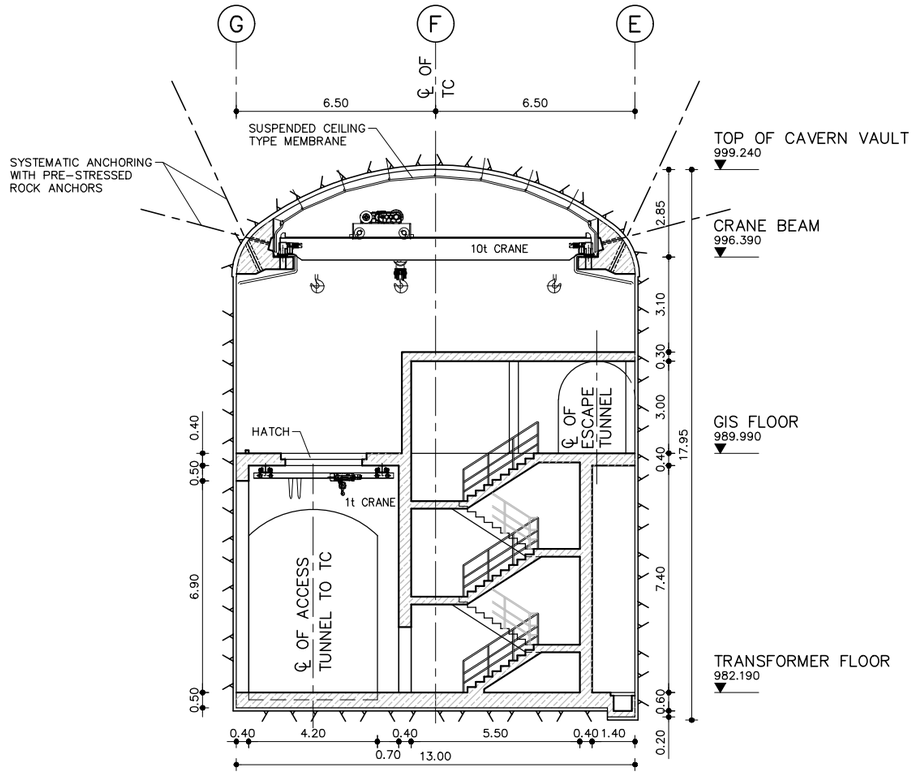
CAD- File No.:

DETAILED DESIGN
POWER STATION
TRANSFORMER CAVERN
CROSS SECTION 6-6

PROJECT DRAWING

Scale A3: 1:200, 1:50

Drwg. No.: 31-00053-DD-4384-Q 1431 REV. –



SECTION 7–7

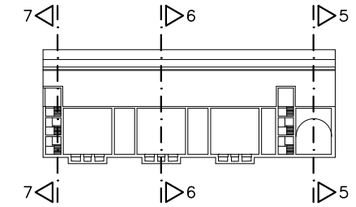
NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO–ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).
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5. ROCK SUPPORT MEASURES NOT SHOWN.
6. ROCK DRAINAGE SYSTEM WITH SYSTEMATIC DRAIN HOLES NOT SHOWN.

DRAFT STATUS:
27.09.2018

SCALE 1:200
–2 0 2 4 6 8 10 [m]

KEYPLAN



LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE
- (206) NUMBER OF EL–ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

Reference Drawings

Drwg. No.	Title
31–00053–DD–4300–1400	POWER STATION, LAYOUT

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.08.18
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:

CAD– File No.:

DETAILED DESIGN

POWER STATION
TRANSFORMER CAVERN
CROSS SECTIONS

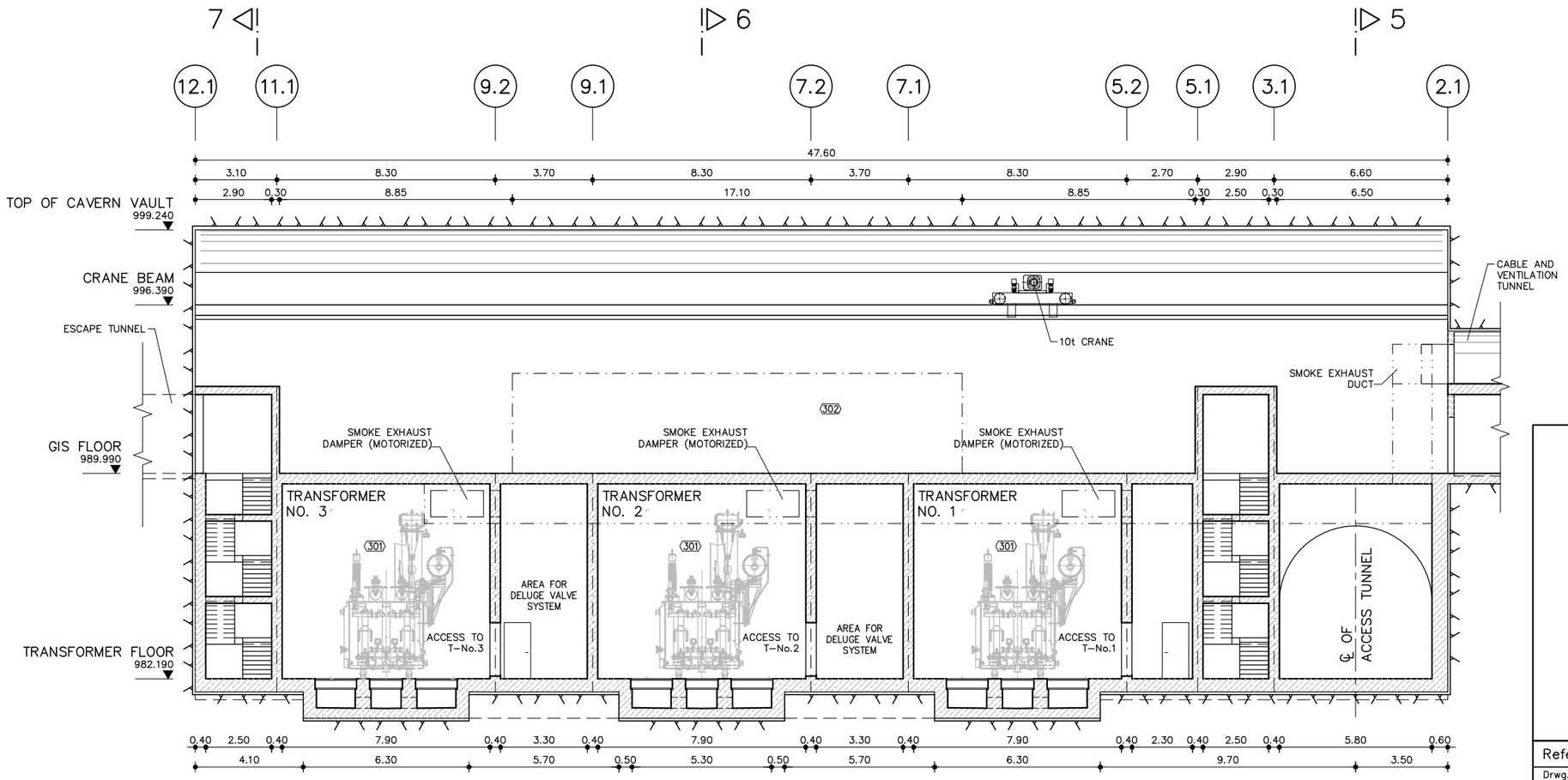
PROJECT DRAWING

Scale A3: 1:200

Drwg. No.: 31–00053–DD–4384–Q 1432 REV. –

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO-ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).
4. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
5. ROCK SUPPORT MEASURES NOT SHOWN.
6. ROCK DRAINAGE SYSTEM WITH SYSTEMATIC DRAIN HOLES NOT SHOWN.

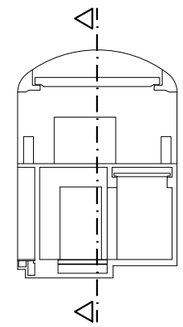


LONGITUDINAL SECTION
THROUGH ℄ OF TC

DRAFT STATUS:
27.09.2018

SCALE 1:200
−2 0 2 4 6 8 10 [m]

KEYPLAN



LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT-COORDINATE
- (206) NUMBER OF EL-ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

Reference Drawings

Drwg. No.	Title
31-00053-DD-4300-1400	POWER STATION, LAYOUT

Revisions

	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.08.18
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:

CAD- File No.:

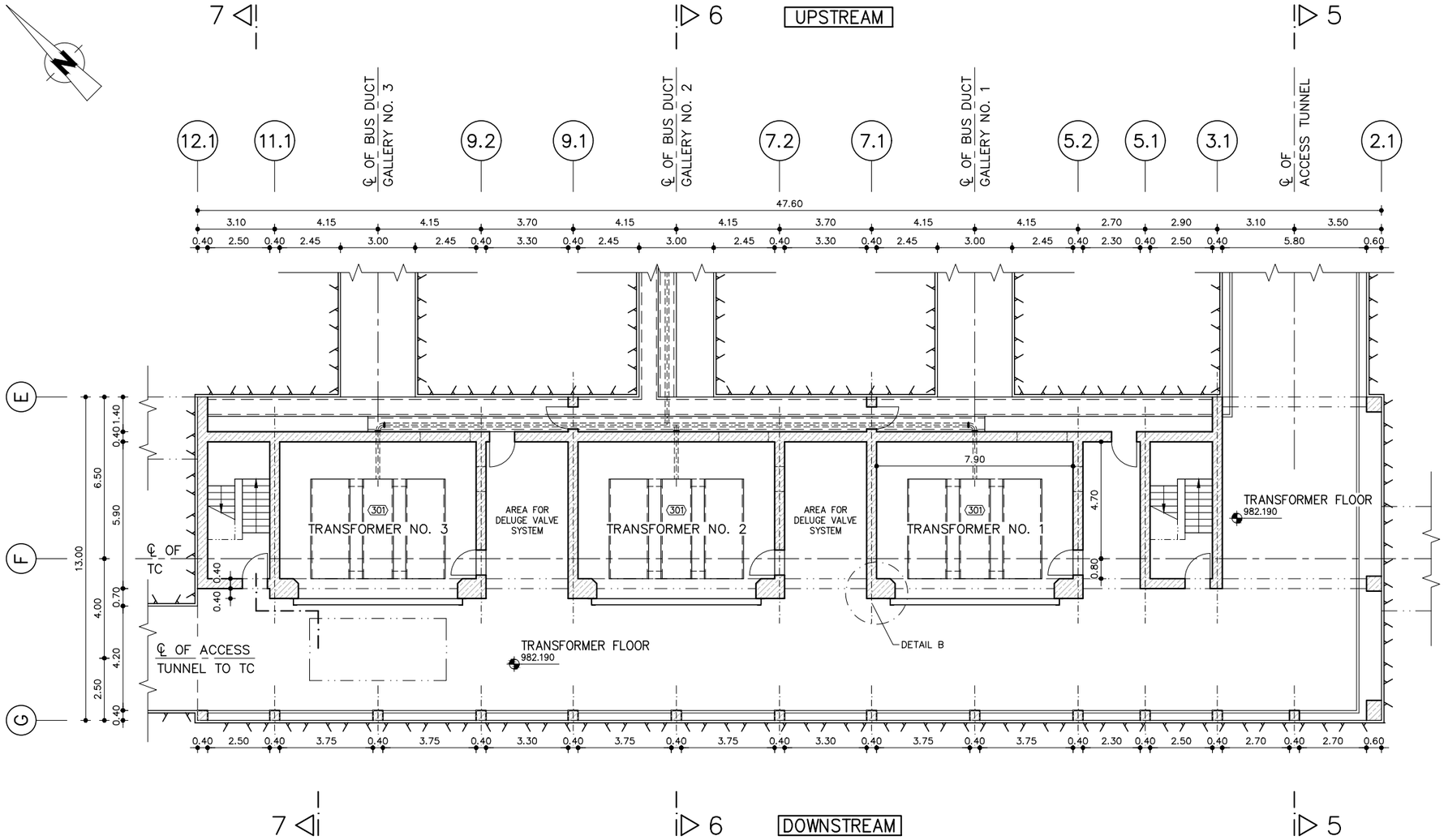
DETAILED DESIGN

POWER STATION
TRANSFORMER CAVERN
LONGITUDINAL SECTION
THROUGH ℄ OF TC

PROJECT DRAWING

Scale A3: 1:200

Drwg. No.: 31-00053-DD-4384-Q 1433 REV. —



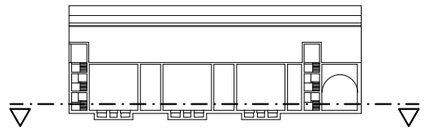
NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO-ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).
4. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
5. ROCK SUPPORT MEASURES NOT SHOWN.
6. ROCK DRAINAGE SYSTEM WITH SYSTEMATIC DRAIN HOLES NOT SHOWN.

DRAFT STATUS:
27.09.2018

SCALE 1:200
−2 0 2 4 6 8 10 [m]

KEYPLAN

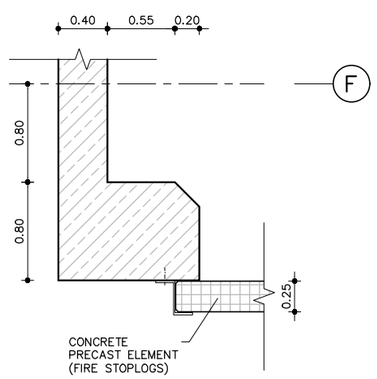


TRANSFOMRER FLOOR

LEVEL 982.190

LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT-COORDINATE
- (206) NUMBER OF EL-ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER



DETAIL B

SCALE 1:50

Reference Drawings

Drwg. No.	Title
31-00053-DD-4300-1400	POWER STATION, LAYOUT

Revisions

	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.08.18
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:

CAD- File No.:

Scale A3: 1:200

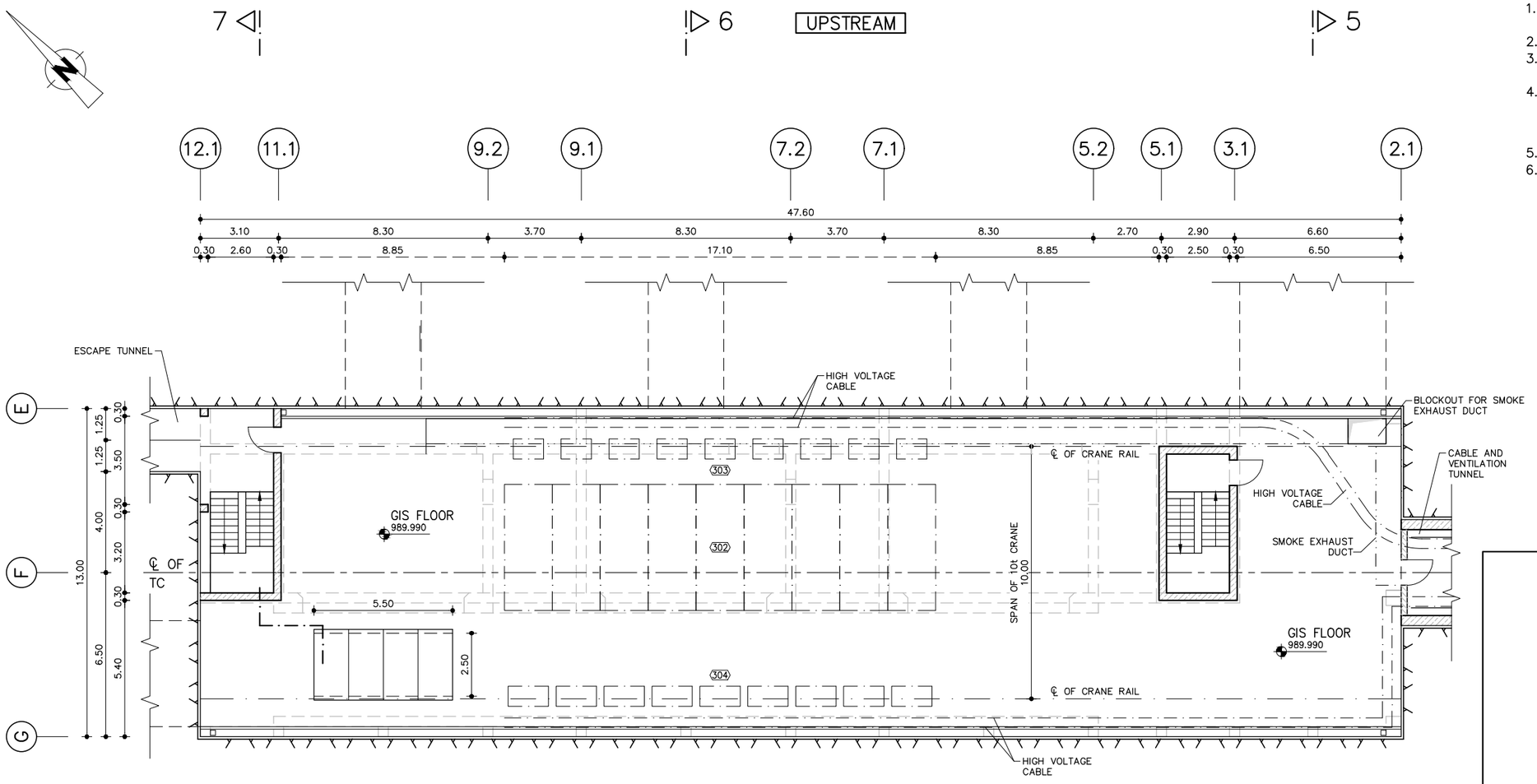
DETAILED DESIGN

POWER STATION

TRANSFORMER CAVERN

TRANSFORMER FLOOR
EL. 982.190
PLAN
PROJECT DRAWING

Drwg. No.: 31-00053-DD-4384-Q 1434 REV. —



GIS FLOOR
LEVEL 989.990

LEGEND:

- CONCRETE CLASS C1 – FIRST STAGE CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE
- (206) NUMBER OF EL–ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

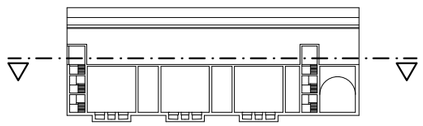
NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO–ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).
4. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
5. ROCK SUPPORT MEASURES NOT SHOWN.
6. ROCK DRAINAGE SYSTEM WITH SYSTEMATIC DRAIN HOLES NOT SHOWN.

DRAFT STATUS:
27.09.2018

SCALE 1:200
–2 0 2 4 6 8 10 [m]

KEYPLAN



Reference Drawings

Drwg. No.	Title
31–00053–DD–4300–1400	POWER STATION, LAYOUT

Revisions	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.08.18
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

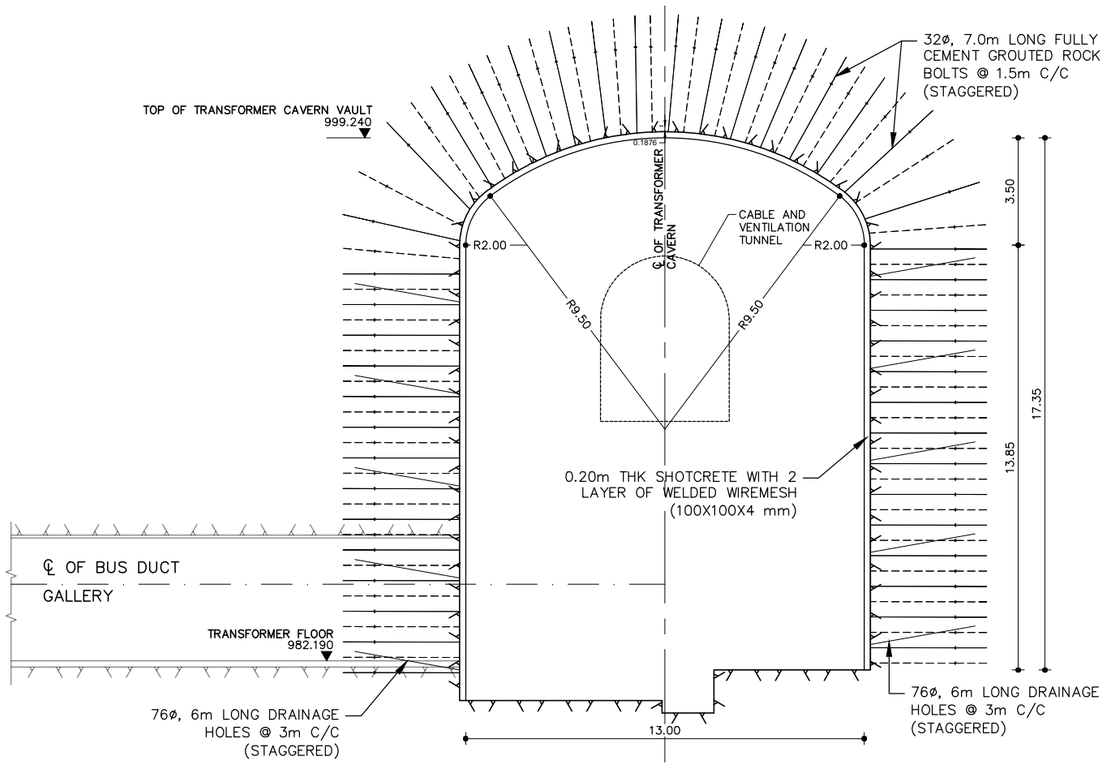
Replaces Drwg. No:

CAD– File No.:

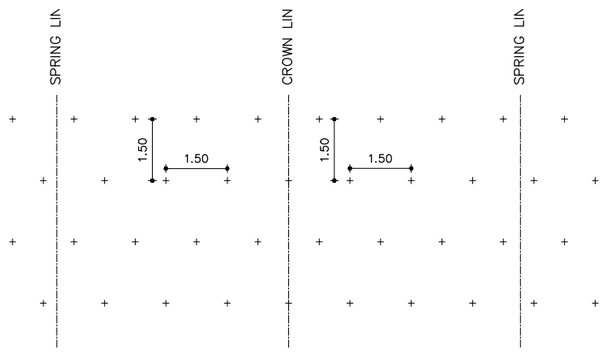
Scale A3: 1:200

DETAILED DESIGN
POWER STATION
TRANSFORMER CAVERN
GIS FLOOR
EL. 989.990
PLAN
PROJECT DRAWING

Drwg. No.: 31–00053–DD–4384–Q 1435 REV. –



TYPICAL DETAILS OF SUPPORT SYSTEM
TRANSFORMER CAVERN
SCALE 1:200



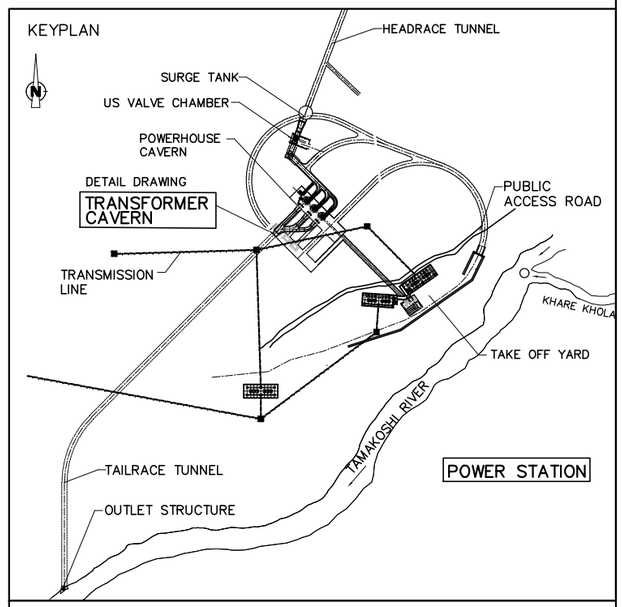
TYPICAL DETAILS OF ROCK BOLTS IN CROWN
(DEVELOPED VIEW)

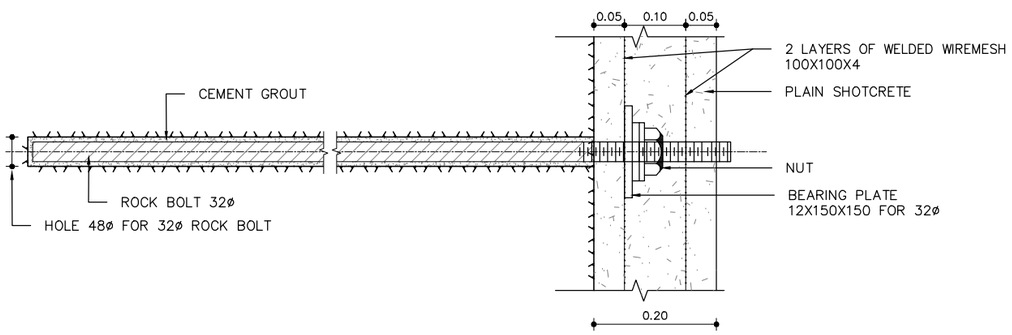
DRAFT STATUS:
27.09.2018

NOTES:
1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].

NOTES DRAIN HOLES:
1. DRAIN HOLES SHALL BE DRILLED AFTER INSTALLATION OF BOLTS
2. DRAIN HOLES L=6.00 m, INCLINED 5°. DIA ø76 mm
3. DRAIN HOLE SHALL BE EQUIPPED WITH SUITABLE FILTER PIPES (SLOTTED PVC PIPES WRAPPED WITH GEOTEXTILE)
4. PATTERN 9 m2 (3.00 BY 3.00).
5. DRAIN HOLE PATTERN MAY BE ADJUSTED ON SITE TO SUIT WATER INFLOW FROM PARTICULARLY PERMEABLE ROCK STRATA. DRAIN HOLES IN THE CAVERN VAULT SHALL BE ALIGNED VERTICALLY, TO ALLOW FOR DIRECT CONNECTION OF VERTICAL COLLECTING PIPES.

SCALE 1:200
−2 0 2 4 6 8 10 [m]





TYPICAL ROCK BOLT AND SHOTCRETE DETAILS
NOT TO SCALE

NOTES ON ROCKSUPPORT:
1. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
2. ALL SHOTCRETE SHALL BE PLAIN SHOTCRETE.
3. FULLY CEMENT GROUTED ROCK BOLTS SHALL HAVE THE FOLLOWING CHARACTERISTICS:
 - DIA. 32 MM
 - YIELD STRENGTH 500 N/MM²
 - MAXIMUM TENSILE CAPACITY 349 KN
4. ROCK SUPPORT MEASURES SHOWN ON THIS DRAWING ARE PRELIMINARY ONLY. FINAL ARRANGEMENT OF ROCK SUPPORT (SHOTCRETE THICKNESSES; LENGTH, ORIENTATION AND GRID OF ROCK BOLTS) HAVE TO BE ADOPTED TO ACTUAL GEOTECHNICAL CONDITIONS, SUBJECT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR.
5. 10 NOS. PRESTRESSED ROCK ANCHORS WITH A LENGTH OF 20 M AND A WORKING LOAD OF 1,000 KN HAVE TO BE AVAILABLE ON SITE FOR UNEXPECTED GEOTECHNICAL CONDITIONS.
6. INTERSECTING TUNNELS ON THE LAST 12M BEFORE ENTERING THE CHAMBER SHALL BE SUPPORTED 1 RS HIGHER THAN WOULD BE APPLICABLE ACCORDING TO THE GEOLOGY.
7. ROCKSUPPORT ON THE PERIPHERY OF INTERSECTING TUNNEL DEPENDS ON SEQUENCE OF EXCAVATION AND SHALL BE MODIFIED BY THE ENGINEER AT SITE PRIOR APPLYING.

Reference Drawings

Drwg. No.	Title
31−00053−DD−4384−Q−1430	POWER STATION−TRANSFORMER CAVERN−CROSS SECTION

Revisions			
	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	R. Shrivastava	27.09.18
Drawn	A. K. Basu	27.09.18
Checked	Roloff	27.09.18
Approved	Dr. Moeller	27.09.18

Replaces Drwg. No:
31−00053−DD−4344−Y−0000_−

CAD− File No.:

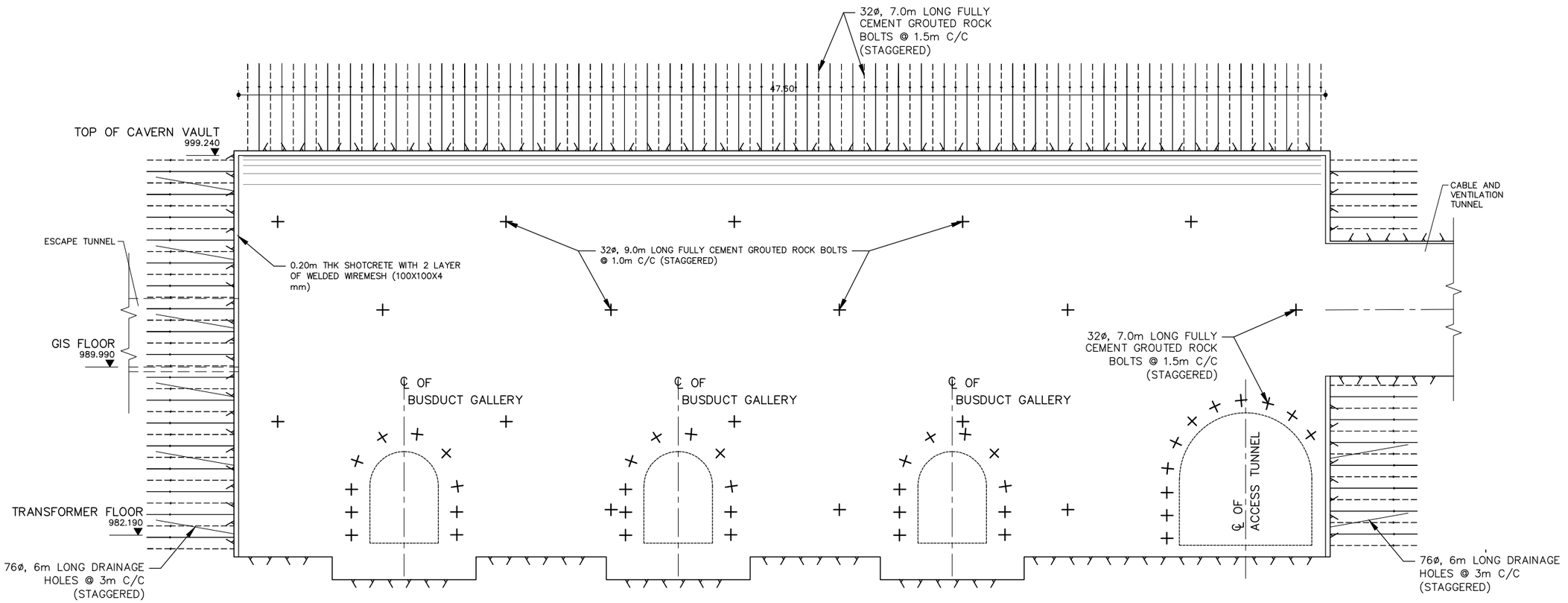
Scale A3: 1:200

DETAILED DESIGN

POWER STATION
TRANSFORMER CAVERN
EXCAVATION AND ROCK SUPPORT DETAIL

PROJECT DRAWING

Drwg. No.: 31−00053−DD−4384− S 1436 REV. −



LONGITUDINAL SECTION
THROUGH ℄ OF TC

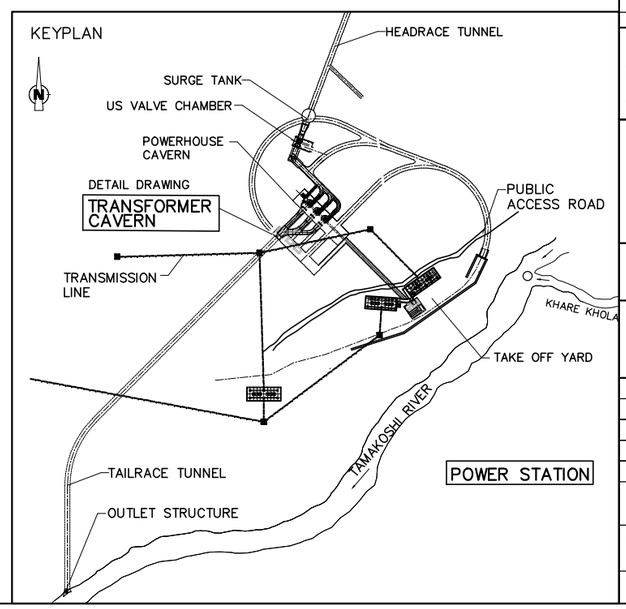
DRAFT STATUS: 27.09.2018

NOTES:
1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].

NOTES ON ROCKSUPPORT:
1. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
2. ALL SHOTCRETE SHALL BE PLAIN SHOTCRETE.
3. FULLY CEMENT GROUTED ROCK BOLTS SHALL HAVE THE FOLLOWING CHARACTERISTICS:
 - DIA. 32 MM
 - YIELD STRENGTH 500 N/MM²
 - MAXIMUM TENSILE CAPACITY 349 KN
4. ROCK SUPPORT MEASURES SHOWN ON THIS DRAWING ARE PRELIMINARY ONLY. FINAL ARRANGEMENT OF ROCK SUPPORT (SHOTCRETE THICKNESSES; LENGTH, ORIENTATION AND GRID OF ROCK BOLTS) HAVE TO BE ADOPTED TO ACTUAL GEOTECHNICAL CONDITIONS, SUBJECT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR.
5. 10 NOS. PRESTRESSED ROCK ANCHORS WITH A LENGTH OF 20 M AND A WORKING LOAD OF 1,000 KN HAVE TO BE AVAILABLE ON SITE FOR UNEXPECTED GEOTECHNICAL CONDITIONS.
6. INTERSECTING TUNNELS ON THE LAST 12M BEFORE ENTERING THE CHAMBER SHALL BE SUPPORTED 1 RS HIGHER THAN WOULD BE APPLICABLE ACCORDING TO THE GEOLOGY.
7. ROCKSUPPORT ON THE PERIPHERY OF INTERSECTING TUNNEL DEPENDS ON SEQUENCE OF EXCAVATION AND SHALL BE MODIFIED BY THE ENGINEER AT SITE PRIOR APPLYING.

NOTES DRAIN HOLES:
1. DRAIN HOLES SHALL BE DRILLED AFTER INSTALLATION OF BOLTS
2. DRAIN HOLES L=6.00 m, INCLINED 5°. DIA ø76 mm
3. DRAIN HOLE SHALL BE EQUIPPED WITH SUITABLE FILTER PIPES (SLOTTED PVC PIPES WRAPPED WITH GEOTEXTILE)
4. PATTERN 9 m2 (3.00 BY 3.00).
5. DRAIN HOLE PATTERN MAY BE ADJUSTED ON SITE TO SUIT WATER INFLOW FROM PARTICULARLY PERMEABLE ROCK STRATA. DRAIN HOLES IN THE CAVERN VAULT SHALL BE ALIGNED VERTICALLY, TO ALLOW FOR DIRECT CONNECTION OF VERTICAL COLLECTING PIPES.

SCALE 1:200
−2 0 2 4 6 8 10 [m]



Reference Drawings

Drwg. No.	Title
31−00053−DD−4384−Q−1430	POWER STATION−TRANSFORMER CAVERN−CROSS SECTION

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	R. Shrivastava	27.09.18
Drawn	A. K. Basu	27.09.18
Checked	Roloff	27.09.18
Approved	Dr. Moeller	27.09.18

Replaces Drwg. No: 31−00053−DD−4344−Y−0000_−

CAD− File No.:

DETAILED DESIGN

POWER STATION

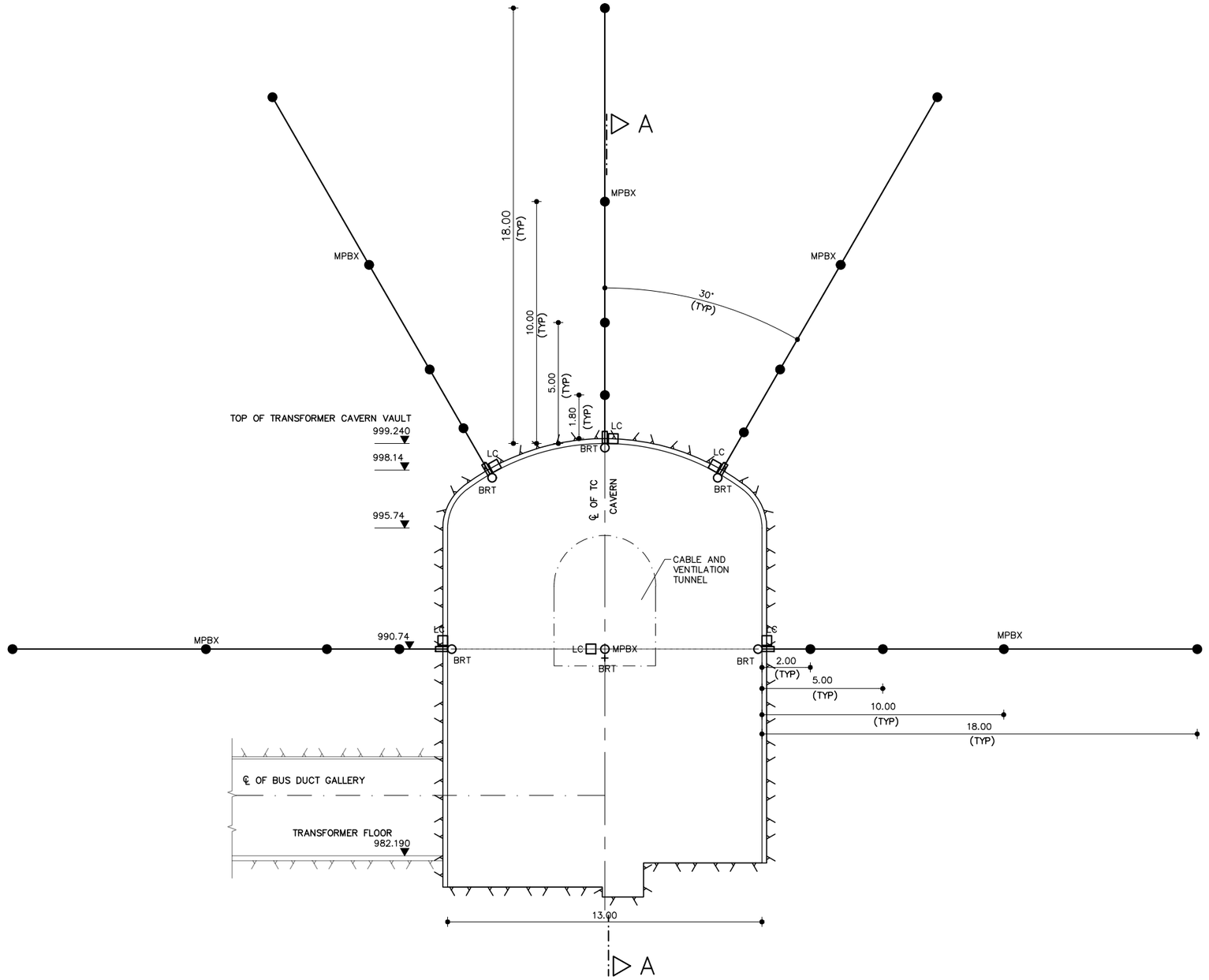
TRANSFORMER CAVERN, LONGITUDINAL SECTION

EXCAVATION AND ROCK SUPPORT DETAIL

PROJECT DRAWING

Scale A3: 1:200

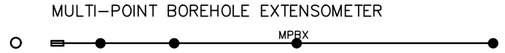
Drwg. No.: 31−00053−DD−4384− S 1437 REV. −



TRANSFORMER CAVERN
INSTRUMENTATION DETAIL
SCALE 1:200

LEGEND:

MULTI–POINT BOREHOLE EXTENSOMETER



ANCHOR LOAD CELL

LC□

BRT (BI–REFLEX–TARGET)

NOTES TO INSTRUMENTATION:

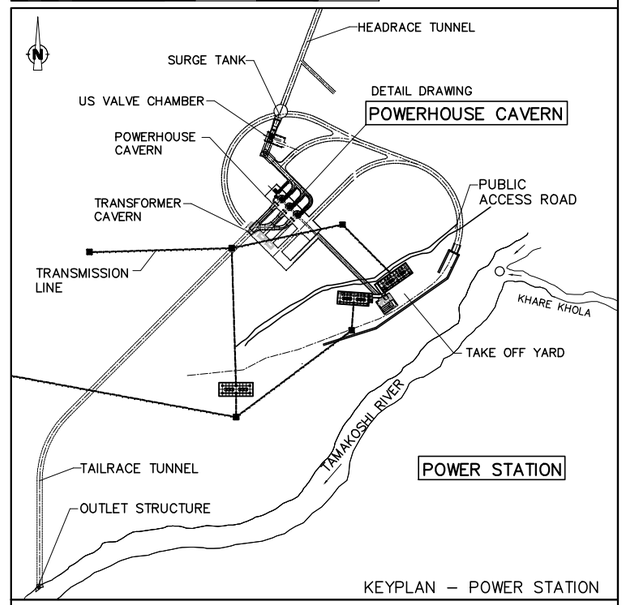
1. EACH EXTENSOMETER HEAD SHALL BE EQUIPPED WITH A GEODETIC SURVEY POINT.
2. TENDONS IF INSTALLED SHALL BE EQUIPPED WITH A LOAD CELL.
3. LOAD CELLS SHALL BE INSTALLED ON ANCHORS THAT ARE AT AS INDICATED OR NEAR THE MONITORING SECTIONS.
4. IF NICHES PROVIDED FOR EXTENSOMETER AT FACE WALLS THOSE SHALL BE EQUIPPED WITH A BEACON TO ALLOW GEODETIC SURVEY.
5. CONVERGENCY SECTIONS AT INTERSECTING TUNNELS SHALL BE LOCATED AT 2 m DISTANCE.

DRAFT STATUS:
27.09.2018

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CABLE FROM INDIVIDUAL INSTRUMENTS AT DIFFERENT LOCATIONS WILL BE CONNECTED TO SWITCH BOXES FOR OBSERVING DATA.
4. CABLES WILL BE PROVIDED IN CONDUITS AND PROTECTIVE COVER WILL BE PROVIDED FOR INSTRUMENTS.
5. FOR TRANSFORMER CAVERN, INSTRUMENT ARE TO BE PROPOSED AT THREE CROSS SECTION ie. AT CENTRE AND AT 5m DISTANCE FROM EACH GABLE END INSIDE TRANSFORMER CAVERN.
6. FOR TRANSFORMER CAVERN ONE SET OF INSTRUMENT AT EACH GABLE END ARE ALSO PROPOSED.

SCALE 1:200
−2 0 2 4 6 8 10 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
:::::::::	::::::::::

Revisions

	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	R. Shrivastava	27.09.18
Drawn	A. K. Basu	27.09.18
Checked	Roloff	27.09.18
Approved	Dr. Moeller	27.09.18

Replaces Drwg. No:
31–00053–DD–4344–Y–0000_–

CAD– File No.:

Scale A3: 1:200

DETAILED DESIGN
POWER STATION
TRANSFORMER CAVERN
CROSS–SECTION
INSTRUMENTATION DETAILS
PROJECT DRAWING

Drwg. No.: 31–00053–DD–4384– S 1438 | REV. | –

LEGEND:

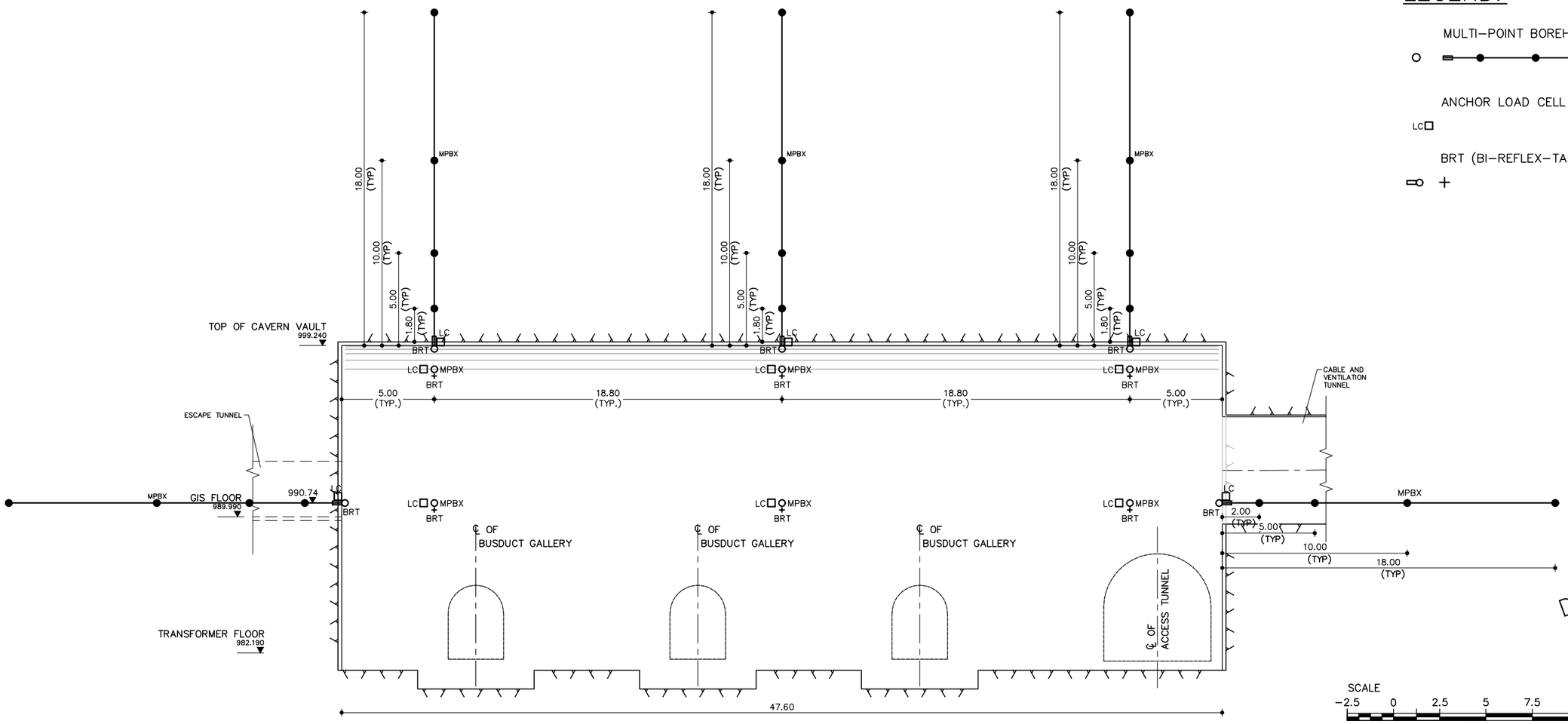
MULTI–POINT BOREHOLE EXTENSOMETER

MPBX

ANCHOR LOAD CELL

LC

BRT (BI–REFLEX–TARGET)



LONGITUDINAL SECTION A–A

THROUGH ℄ OF TC

SCALE 1:250

–2.5 0 2.5 5 7.5 10 12.5 [m]

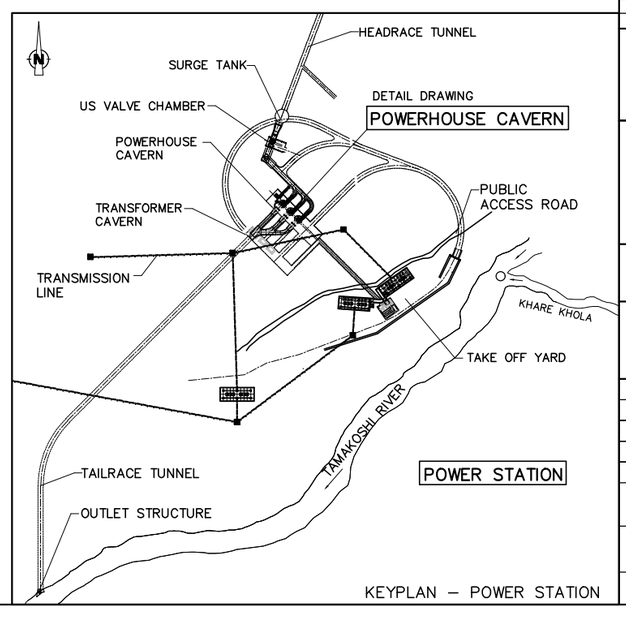
DRAFT STATUS: 27.09.2018

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CABLE FROM INDIVIDUAL INSTRUMENTS AT DIFFERENT LOCATIONS WILL BE CONNECTED TO SWITCH BOXES FOR OBSERVING DATA.
4. CABLES WILL BE PROVIDED IN CONDUITS AND PROTECTIVE COVER WILL BE PROVIDED FOR INSTRUMENTS.
5. FOR TRANSFORMER CAVERN, INSTRUMENT ARE TO BE PROPOSED AT THREE CROSS SECTION ie. AT CENTRE AND AT 5m DISTANCE FROM EACH GABLE END INSIDE TRANSFORMER CAVERN.
6. FOR TRANSFORMER CAVERN ONE SET OF INSTRUMENT AT EACH GABLE END ARE ALSO PROPOSED.

NOTES TO INSTRUMENTATION:

1. EACH EXTENSOMETER HEAD SHALL BE EQUIPPED WITH A GEODETIC SURVEY POINT.
2. TENDONS IF INSTALLED SHALL BE EQUIPPED WITH A LOAD CELL.
3. LOAD CELLS SHALL BE INSTALLED ON ANCHORS THAT ARE AT AS INDICATED OR NEAR THE MONITORING SECTIONS.
4. IF NICHES PROVIDED FOR EXTENSOMETER AT FACE WALLS THOSE SHALL BE EQUIPPED WITH A BEACON TO ALLOW GEODETIC SURVEY.
5. CONVERGENCY SECTIONS AT INTERSECTING TUNNELS SHALL BE LOCATED AT 2 m DISTANCE.



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
::::::::	::::::::::::

Revisions

	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT

DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	R. Shrivastava	27.09.18
Drawn	A. K. Basu	27.09.18
Checked	Roloff	27.09.18
Approved	Dr. Moeller	27.09.18

Replaces Drwg. No:
31–00053–DD–4344–Y–0000_–

CAD– File No.:

Scale A3: 1:250

DETAILED DESIGN

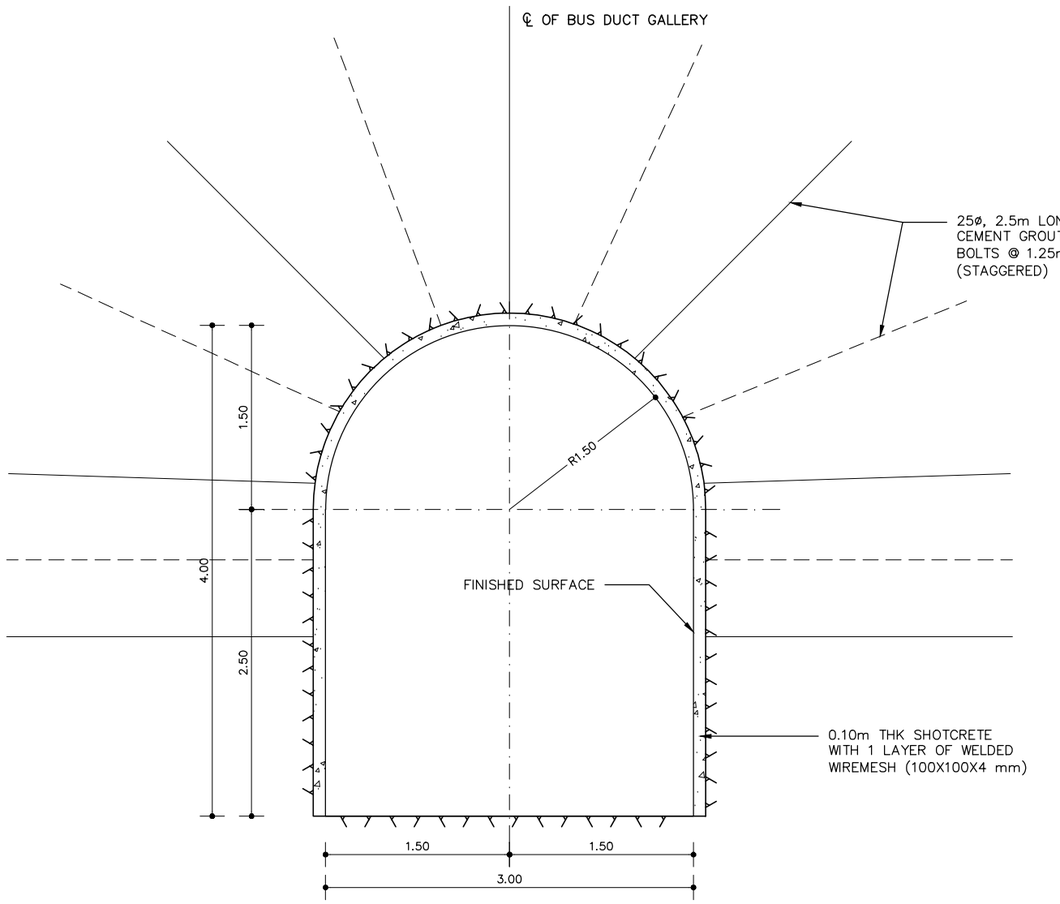
POWER STATION

TRANSFORMER CAVERN

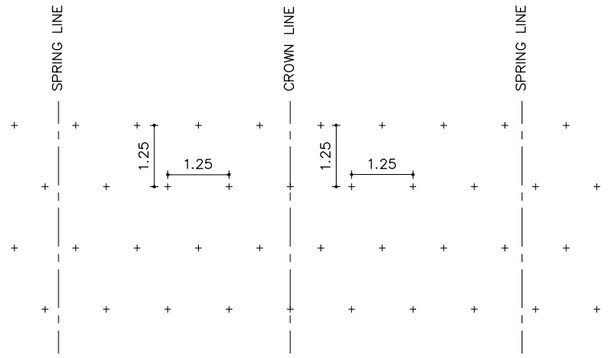
LONGITUDINAL SECTION A–A
INSTRUMENTATION DETAILS

PROJECT DRAWING

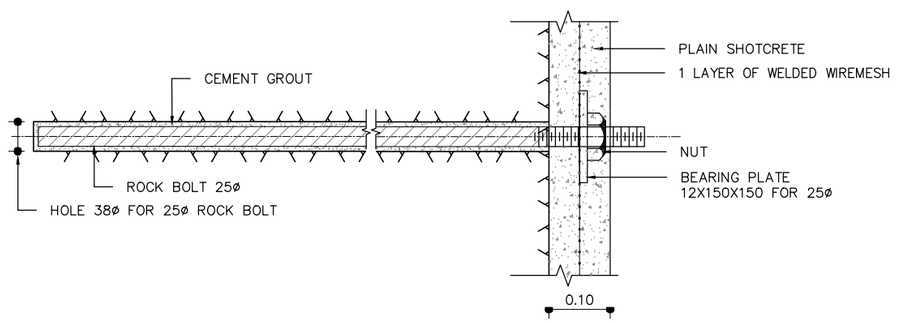
Drwg. No.: 31–00053–DD–4384– S 1439 REV. –



TYPICAL DETAILS OF SUPPORT SYSTEM



TYPICAL DETAILS OF ROCK BOLTS OF BUS DUCT GALLERY
(DEVELOPED VIEW)



TYPICAL ROCK BOLT AND SHOTCRETE DETAILS
NOT TO SCALE

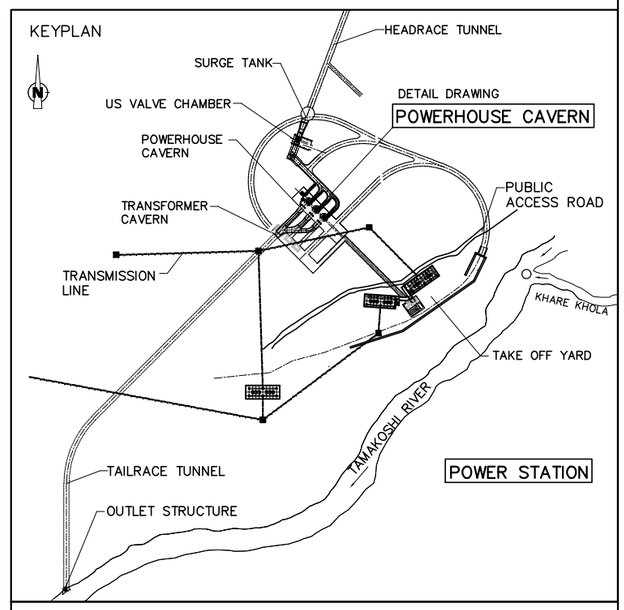
NOTES TO ROCK SUPPORT:

1. ROCK BOLTS SHALL HAVE THE FOLLOWING CHARACTERISTICS:
 - DIA. 25 MM
 - YIELD STRENGTH 500 N/MM²
 - MAXIMUM TENSILE CAPACITY 213 KN
2. THE SHOTCERE MIX SHALL HAVE 28 DAYS OF COMPRESSIVE STRENGTH OF 35MPa.
3. ROCK SUPPORT MEASURES SHOWN ON THIS DRAWING ARE PRELIMINARY ONLY. FINAL ARRANGEMENT OF ROCK SUPPORT (SHOTCRETE THICKNESSES; LENGTH, ORIENTATION AND GRID OF ROCK BOLTS) HAVE TO BE ADOPTED TO ACTUAL GEOTECHNICAL CONDITIONS, SUBJECT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR.
4. THE APPLICATION OF ROCK SUPPORT CLASSES (RSC) DEPENDS ON THE ACTUALLY ENCOUNTERED CONDITIONS AND GEOTECHNICAL MONITORING AND SHALL BE DECIDED BY THE RESPONSIBLE SECTION ENGINEER/GEOLOGIST.
5. CONTOUR BLASTING HAS TO BE DONE SMOOTHLY WITH MINIMUM DAMAGE TO THE REMAINING ROCKMASS AND AVOIDING OVERBREAKS AS MUCH AS POSSIBLE.
6. BOLT ORIENTATION SHALL BE ADAPTED TO ENCOUNTERED REQUIREMENTS, INSTALLED PERPENDICULAR TO THE ADIT PROFILE, IF DEVIATION FROM VERTICALITY REQUIRED SHALL BE RESTRICTED BELOW 30°.
7. IN AREA WITH LARGE WATER INFLOW (SO THAT FULLY GROUTED–BOLT CANNOT BE PLACED) SWELLEX ANCHORS OF CORRESPONDING ARRANGEMENT COULD BE USED INSTEAD OF TEMPORARY SUPPORT UNTIL THE WATER INFLOW IS REDUCED TO A LEVEL THAT ALLOWS SHOTCRETING AND PLACEMENT BY FULLY GROUTED–BOLTS.
8. DRIPPING OR FLOWING WATER HAS TO BE COLLECTED IN PIPES BEFORE SHOTCRETEING SPECIAL DRAIN HOLES MAY BE REQUIRED (USE SWELLEX BOLT).
9. CONDITIONAL FOREPOLING FOR Q–VALUES <0.10, FOREPOLING UMBRELLA SHALL ADOPT AS PER MIN.: ø25 FULLY GROUTED STEEL BARS, 6m EMBEDDED, 2.0m OVERLAP, 300mm SPACING, 10° ANGLE

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
4. ALL SHOTCRETE SHALL BE PLAIN SHOTCRETE WITH WIREMESH IF ASSIGNED IT ACCORDING TO ROCK SUPPORT.

SCALE 1:50
−0.5 0 0.5 1 1.5 2 2.5 [m]



Reference Drawings

Drwg. No.	Title
31–00053–DD–4382–Q–1440	POWER STATION–BUS DUCT GALLERIES–LAYOUT

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	R. Shrivastava	21.09.18
Drawn	A. K. Basu	21.09.18
Checked	Roloff	21.09.18
Approved	Dr. Moeller	21.09.18

Replaces Drwg. No:
31–00053–DD–4364–Y–0000_–

CAD– File No.:

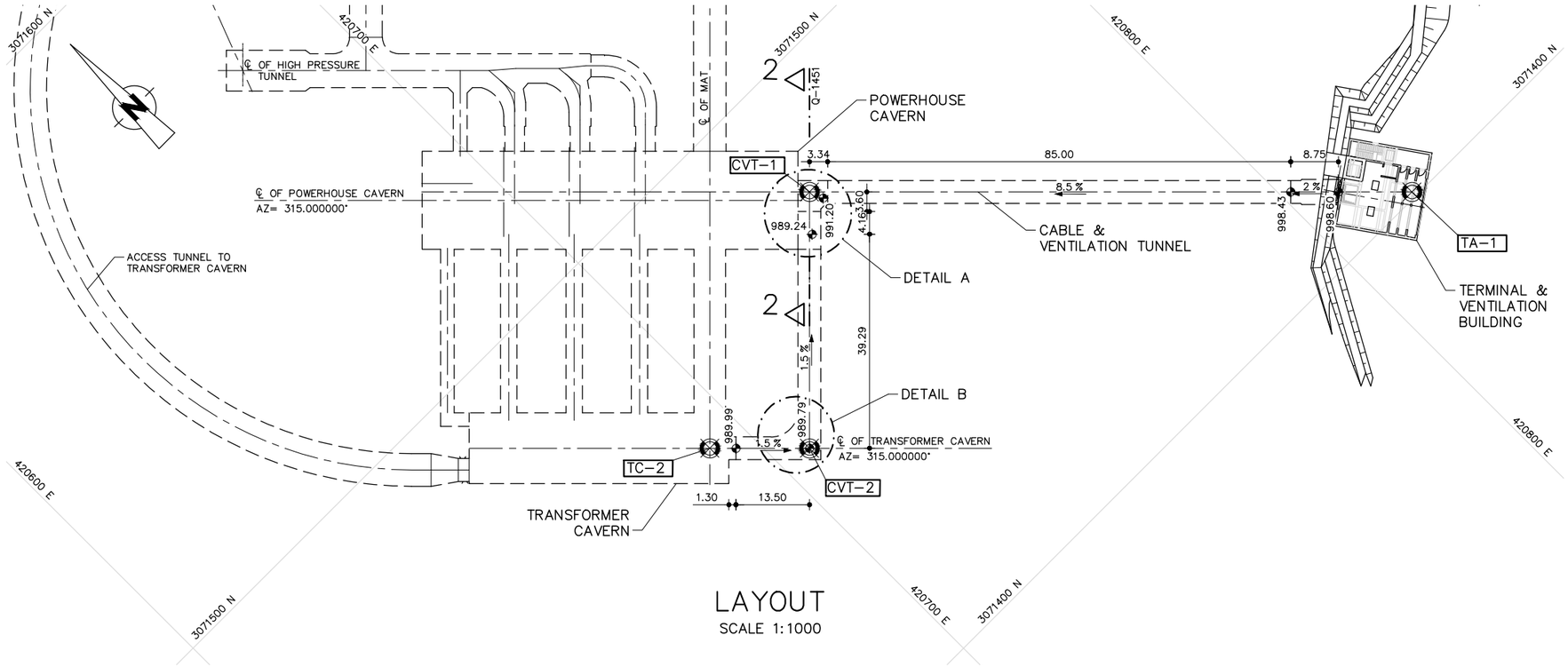
Scale A3: 1:50

DETAILED DESIGN

POWER STATION
BUS DUCT GALLERIES
EXCAVATION AND ROCK SUPPORT

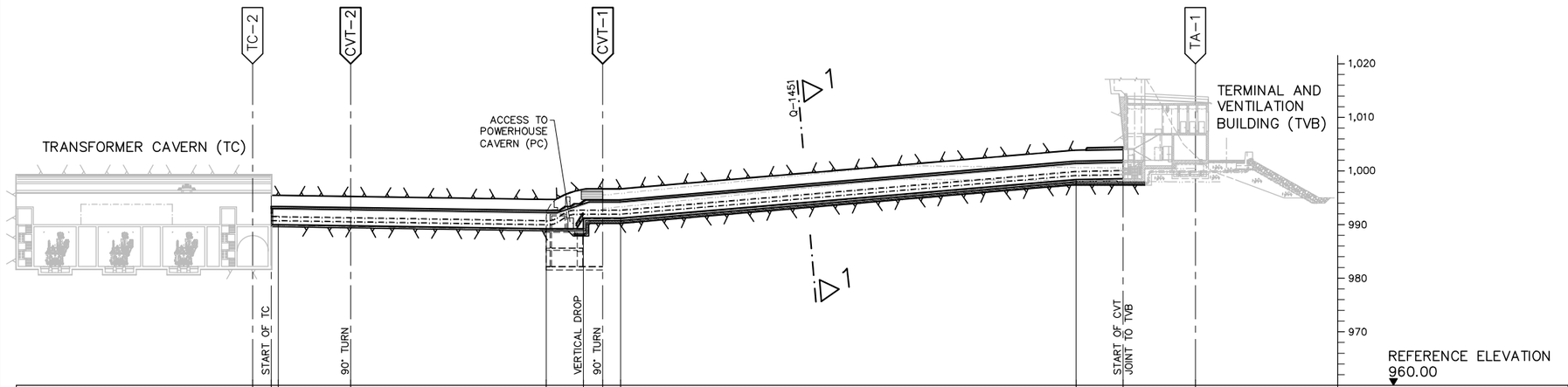
PROJECT DRAWING

Drwg. No.: 31–00053–DD–4382– S 1445 REV. –



LAYOUT

SCALE 1:1000



LONGITUDINAL SECTION

CABLE AND VENTILATION TUNNEL

SCALE 1:1000

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO-ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).

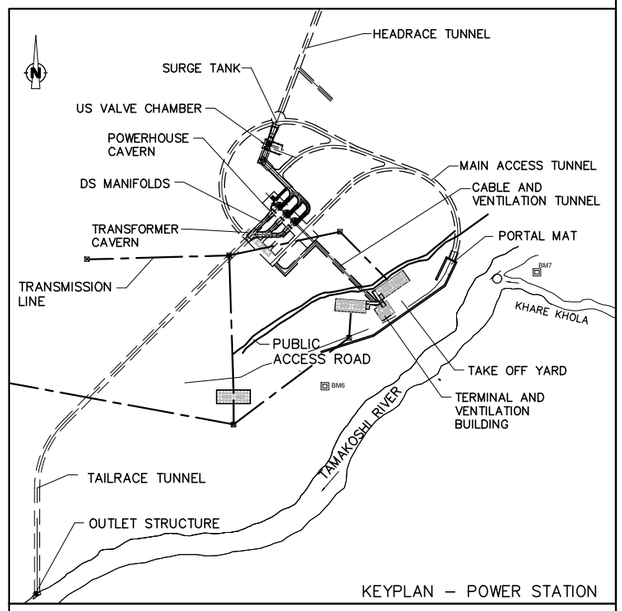
LEGEND:

- FINISHED FLOOR LEVEL
- FIXPOINT-COORDINATE

DRAFT STATUS: 25.09.2018

SCALE 1:1000

−10 0 10 20 30 40 50 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31-00053-DD-4300-1400	POWER STATION, LAYOUT

Revisions	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL — CONSULTING ENGINEERS BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT

DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	25.09.18
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:

CAD- File No.:

Scale A3: 1:1000

DETAILED DESIGN

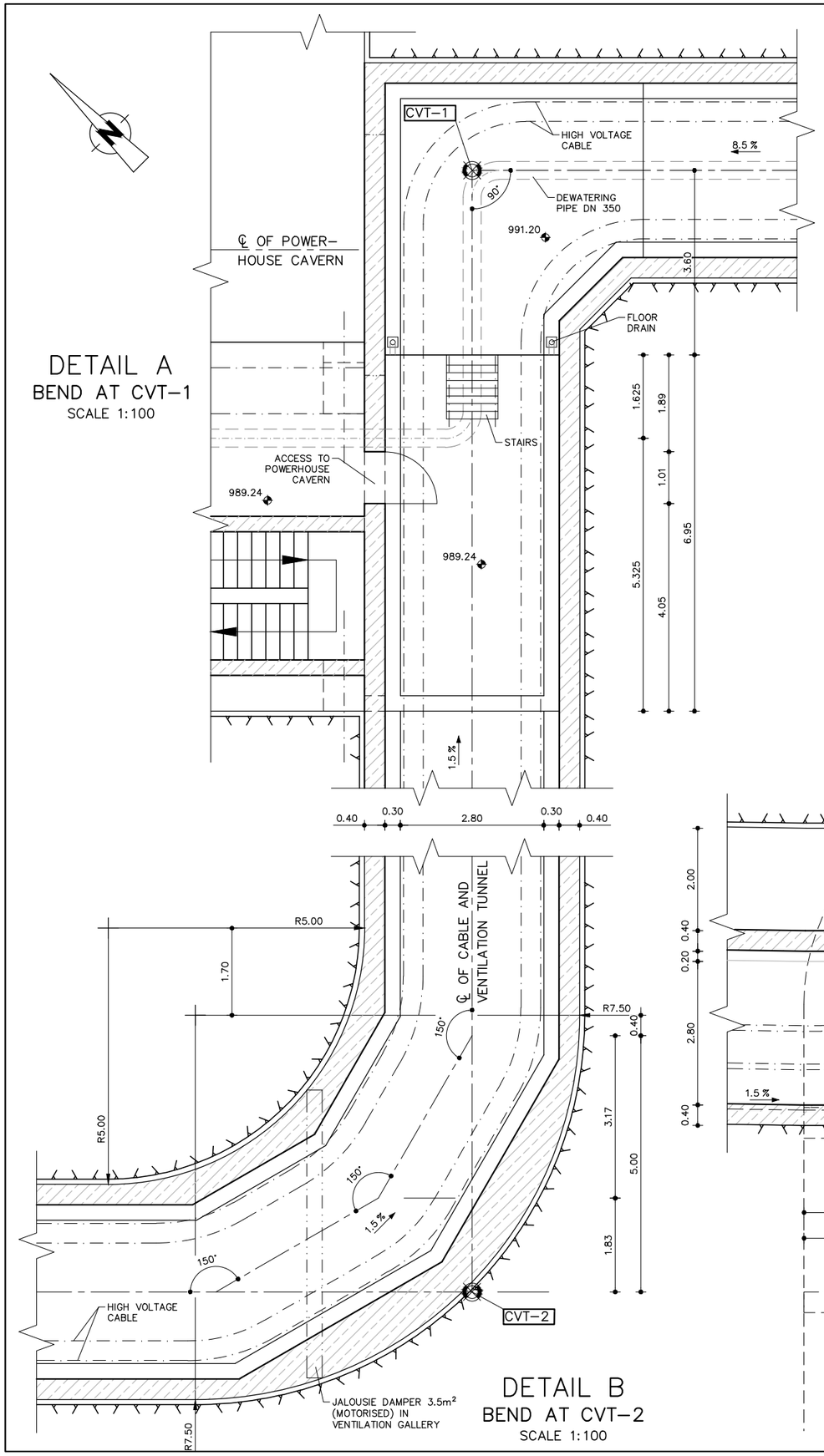
POWER STATION

CABLE & VENTILATION TUNNEL

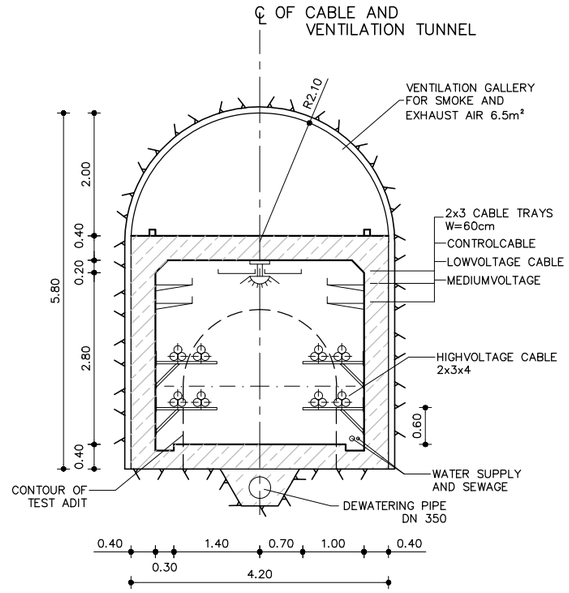
LAYOUT AND LONGITUDINAL SECTION

PROJECT DRAWING

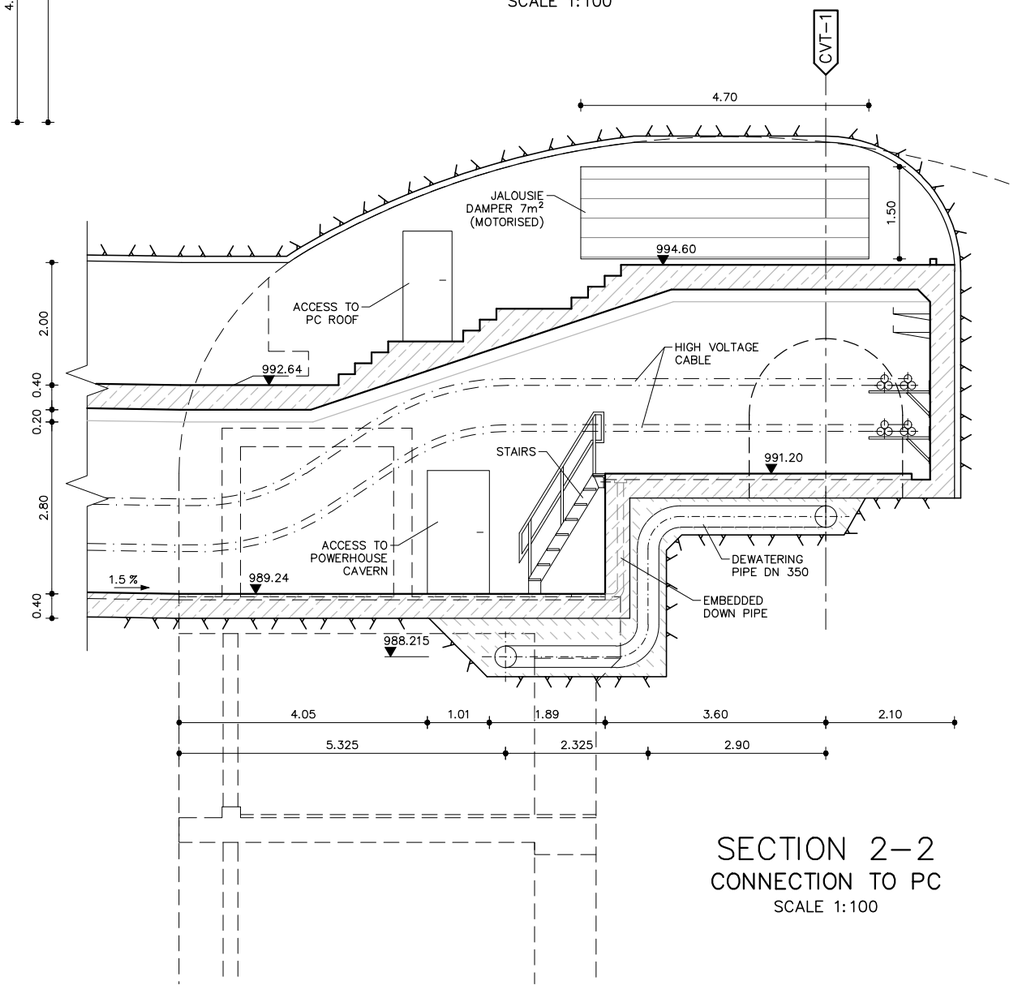
Drwg. No.: 31-00053-DD-4386-Q 1450 REV. –



DETAIL A
BEND AT CVT–1
SCALE 1:100



SECTION 1–1
TYPICAL SECTION OF CVT
SCALE 1:100



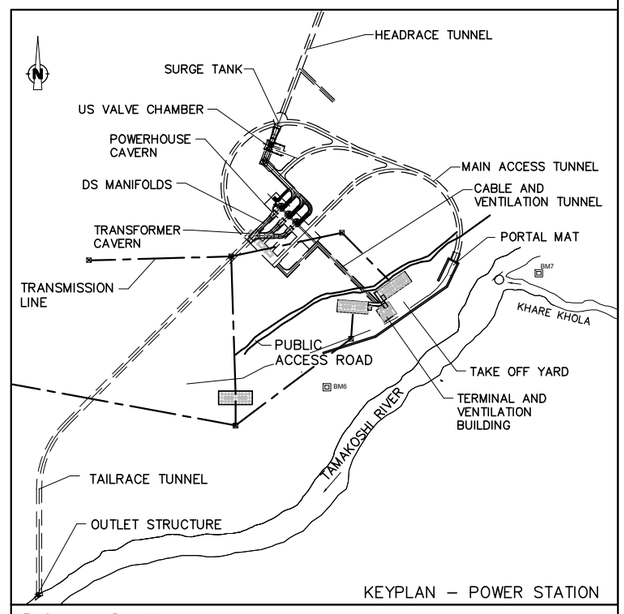
SECTION 2–2
CONNECTION TO PC
SCALE 1:100

NOTES:
1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO–ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).

LEGEND:
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE

DRAFT STATUS: 25.09.2018

SCALE 1:100
–1 0 1 2 3 4 5 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31–00053–DD–4300–1400	POWER STATION, LAYOUT

Revisions

	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	25.09.18
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:

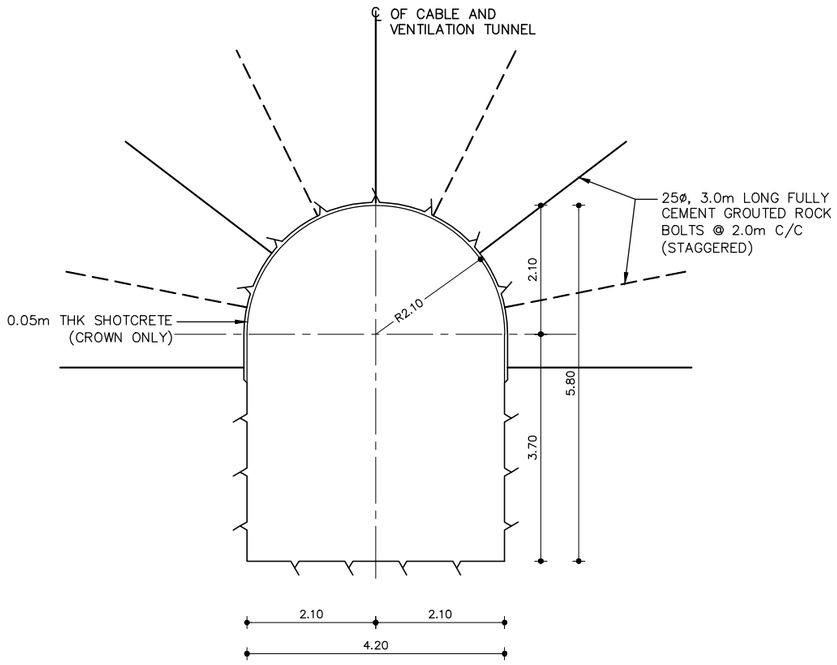
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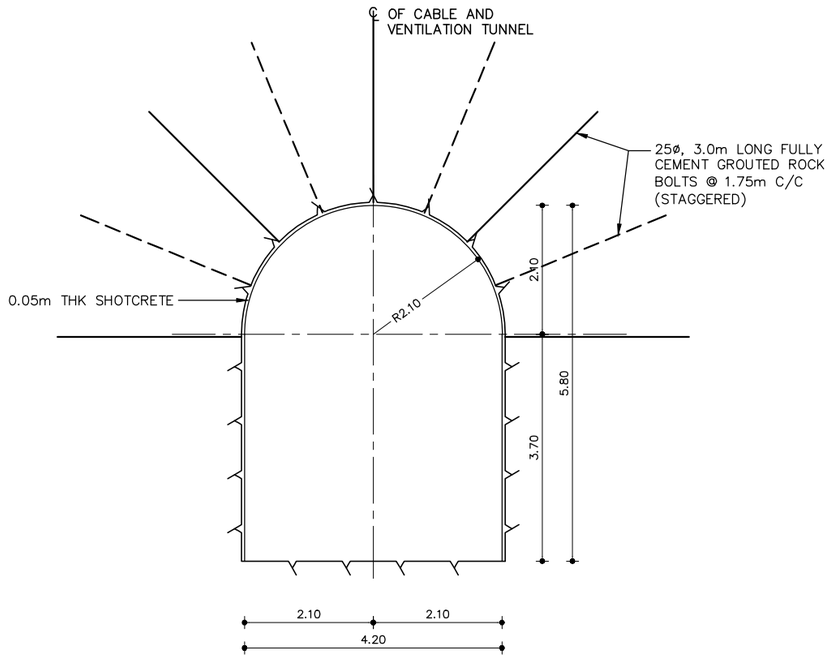
DETAILED DESIGN
POWER STATION
CABLE & VENTILATION TUNNEL
DETAILS AND SECTIONS

PROJECT DRAWING

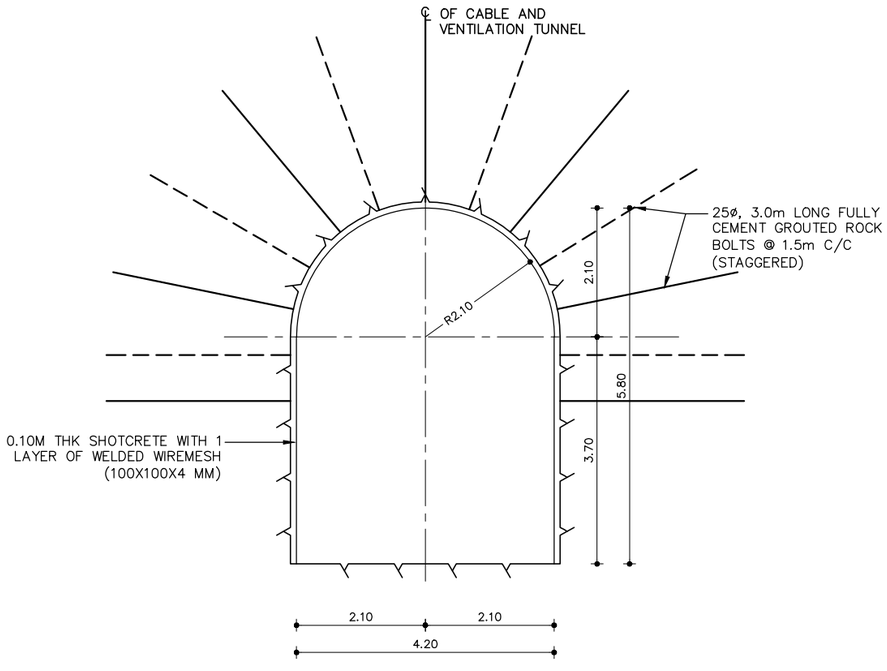
Drwg. No.: 31–00053–DD–4386–Q 1451 REV. –



TYPICAL DETAILS OF SUPPORT SYSTEM FOR ROCK CLASS II



TYPICAL DETAILS OF SUPPORT SYSTEM FOR ROCK CLASS III



TYPICAL DETAILS OF SUPPORT SYSTEM FOR ROCK CLASS IV

NOTES TO ROCK SUPPORT:

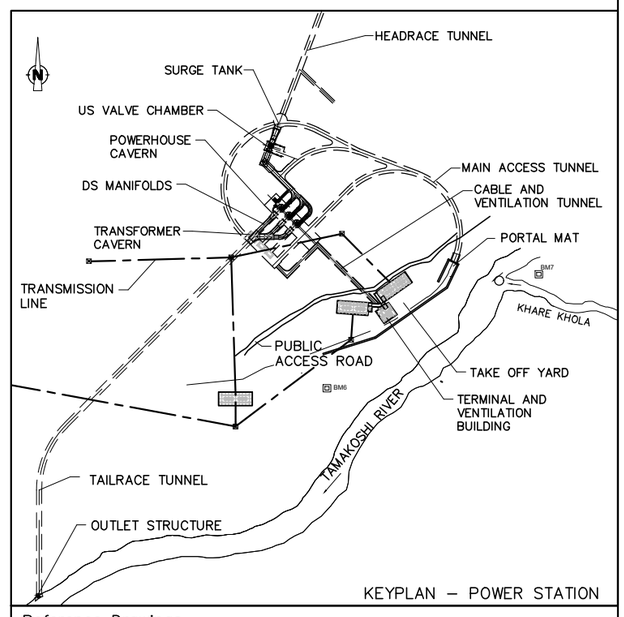
1. ROCK BOLTS SHALL HAVE THE FOLLOWING CHARACTERISTICS:
 - DIA. 25 MM
 - YIELD STRENGTH 500 N/MM²
 - MAXIMUM TENSILE CAPACITY 213 KN
2. THE SHOTCERE MIX SHALL HAVE 28 DAYS OF COMPRESSIVE STRENGTH OF 35MPa.
3. STEEL RIBS SHALL CONFORM TO IS: 226–1975.
4. AN ADDITIONAL LAYER OF 50MM THK PLAIN SHOTCRERE SHALL BE APPLIED ON THE EXPOSED PARTS OF STEEL RIBS FOR PROTECTION AGAINST CORROSION.
5. ROCK SUPPORT MEASURES SHOWN ON THIS DRAWING ARE PRELIMINARY ONLY. FINAL ARRANGEMENT OF ROCK SUPPORT (SHOTCRETE THICKNESSES; LENGTH, ORIENTATION AND GRID OF ROCK BOLTS) HAVE TO BE ADOPTED TO ACTUAL GEOTECHNICAL CONDITIONS, SUBJECT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR.
6. THE APPLICATION OF ROCK SUPPORT CLASSES (RSC) DEPENDS ON THE ACTUALLY ENCOUNTERED CONDITIONS AND GEOTECHNICAL MONITORING AND SHALL BE DECIDED BY THE RESPONSIBLE SECTION ENGINEER/GEOLOGIST.
7. CONTOUR BLASTING HAS TO BE DONE SMOOTHLY WITH MINIMUM DAMAGE TO THE REMAINING ROCKMASS AND AVOIDING OVERBREAKS AS MUCH AS POSSIBLE.
8. BOLT ORIENTATION SHALL BE ADAPTED TO ENCOUNTERED REQUIREMENTS, INSTALLED PERPENDICULAR TO THE ADIT PROFILE, IF DEVIATION FROM VERTICALITY REQUIRED SHALL BE RESTRICTED BELOW 30°.
9. IN AREA WITH LARGE WATER INFLOW (SO THAT FULLY GROUTED–BOLT CANNOT BE PLACED) SWELLEX ANCHORS OF CORRESPONDING ARRANGEMENT COULD BE USED INSTEAD OF TEMPORARY SUPPORT UNTIL THE WATER INFLOW IS REDUCED TO A LEVEL THAT ALLOWS SHOTCRETING AND PLACEMENT BY FULLY GROUTED–BOLTS.
10. DRIPPING OR FLOWING WATER HAS TO BE COLLECTED IN PIPES BEFORE SHOTCRETEING SPECIAL DRAIN HOLES MAY BE REQUIRED (USE SWELLEX BOLT).
11. CONDITIONAL FOREPOLING FOR Q–VALUES <0.10, FOREPOLING UMBRELLA SHALL ADOPT AS PER MIN.: ø25 FULLY GROUTED STEEL BARS, 6m EMBEDDED, 2.0m OVERLAP, 300mm SPACING, 10° ANGLE

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
4. ALL SHOTCRETE SHALL BE PLAIN SHOTCRETE WITH WIREMESH AS ASSIGNED TO ROCK SUPPORT CLASS.

DRAFT STATUS: 21.10.2018

SCALE 1:100
–1 0 1 2 3 4 5 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31–00053–DD–4300–1400	POWER STATION, LAYOUT

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	R. Shrivastava	04.09.18
Drawn	A. K. Basu	04.09.18
Checked	Roloff	04.09.18
Approved	Dr. Moeller	04.09.18

Replaces Drwg. No:

CAD– File No.:

Scale A3: 1:100

DETAILED DESIGN

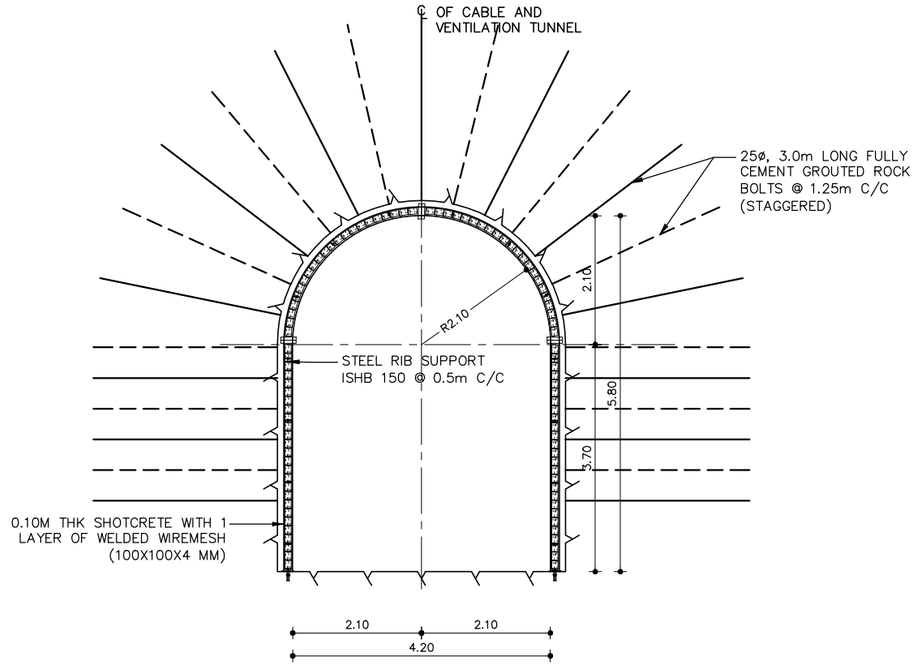
POWER STATION

CABLE & VENTILATION TUNNEL

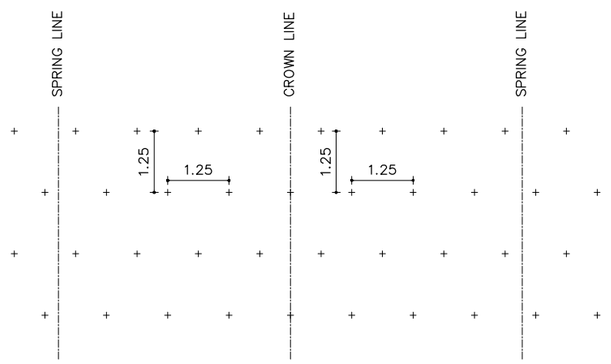
EXCAVATION AND ROCK SUPPORT (SHEET 1 OF 2)

PROJECT DRAWING

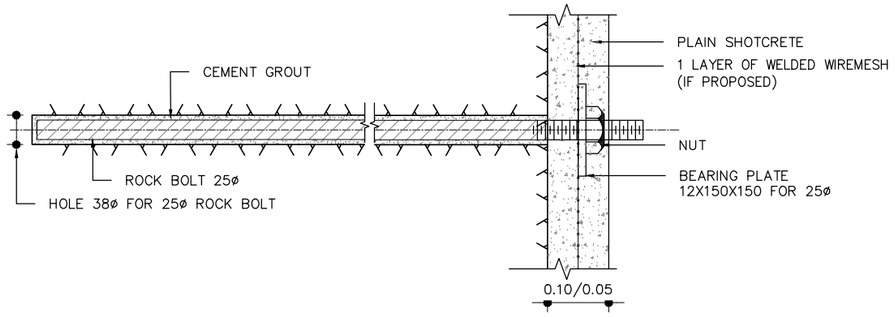
Drwg. No.: 31–00053–DD–4386– S 1455 REV. –



TYPICAL DETAILS OF SUPPORT SYSTEM FOR ROCK CLASS V



TYPICAL DETAILS OF ROCK BOLTS IN CROWN AND WALLS FOR ROCK CLASS V
(DEVELOPED VIEW)
NOT TO SCALE



TYPICAL ROCK BOLT AND SHOTCRETE DETAILS
NOT TO SCALE

NOTES TO ROCK SUPPORT:

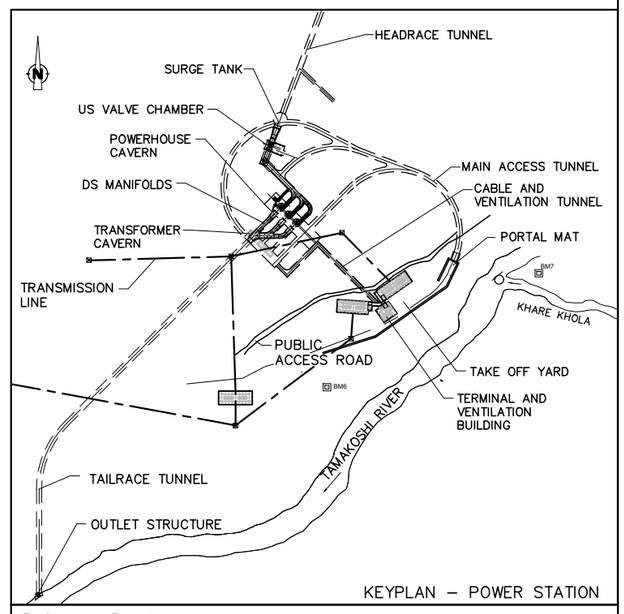
1. ROCK BOLTS SHALL HAVE THE FOLLOWING CHARACTERISTICS:
 – DIA. 25 MM
 – YIELD STRENGTH 500 N/MM²
 – MAXIMUM TENSILE CAPACITY 213 KN
2. THE SHOTCERE MIX SHALL HAVE 28 DAYS OF COMPRESSIVE STRENGTH OF 35MPa.
3. STEEL RIBS SHALL CONFORM TO IS: 226–1975.
4. AN ADDITIONAL LAYER OF 50MM THK PLAIN SHOTCRERE SHALL BE APPLIED ON THE EXPOSED PARTS OF STEEL RIBS FOR PROTECTION AGAINST CORROSION.
5. ROCK SUPPORT MEASURES SHOWN ON THIS DRAWING ARE PRELIMINARY ONLY. FINAL ARRANGEMENT OF ROCK SUPPORT (SHOTCRETE THICKNESSES; LENGTH, ORIENTATION AND GRID OF ROCK BOLTS) HAVE TO BE ADOPTED TO ACTUAL GEOTECHNICAL CONDITIONS, SUBJECT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR.
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8. BOLT ORIENTATION SHALL BE ADAPTED TO ENCOUNTERED REQUIREMENTS, INSTALLED PERPENDICULAR TO THE ADIT PROFILE, IF DEVIATION FROM VERTICALITY REQUIRED SHALL BE RESTRICTED BELOW 30°.
9. IN AREA WITH LARGE WATER INFLOW (SO THAT FULLY GROUTED–BOLT CANNOT BE PLACED) SWELLEX ANCHORS OF CORRESPONDING ARRANGEMENT COULD BE USED INSTEAD OF TEMPORARY SUPPORT UNTIL THE WATER INFLOW IS REDUCED TO A LEVEL THAT ALLOWS SHOTCRETING AND PLACEMENT BY FULLY GROUTED–BOLTS.
10. DRIPPING OR FLOWING WATER HAS TO BE COLLECTED IN PIPES BEFORE SHOTCRETEING SPECIAL DRAIN HOLES MAY BE REQUIRED (USE SWELLEX BOLT).
11. CONDITIONAL FOREPOLING FOR Q–VALUES <0.10, FOREPOLING UMBRELLA SHALL ADOPT AS PER MIN.: ø25 FULLY GROUTED STEEL BARS, 6m EMBEDDED, 2.0m OVERLAP, 300mm SPACING, 10° ANGLE

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
4. ALL SHOTCRETE SHALL BE PLAIN SHOTCRETE WITH WIREMESH AS ASSIGNED TO ROCK SUPPORT CLASS.

DRAFT STATUS: 21.10.2018

SCALE 1:100
–1 0 1 2 3 4 5 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31–00053–DD–4300–1400	POWER STATION, LAYOUT

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	R. Shrivastava	04.09.18
Drawn	A. K. Basu	04.09.18
Checked	Roloff	04.09.18
Approved	Dr. Moeller	04.09.18

Replaces Drwg. No: 31–00053–DD–4364–Y–0000_–

CAD– File No.:

Scale A3: 1:100

DETAILED DESIGN

POWER STATION

CABLE & VENTILATION TUNNEL

EXCAVATION AND ROCK SUPPORT (SHEET 2 OF 2)

PROJECT DRAWING

Drwg. No.: 31–00053–DD–4386– S 1455 REV. –

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO–ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).

LEGEND:

- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE

DRAFT STATUS:
27.09.2018

SCALE 1:1000
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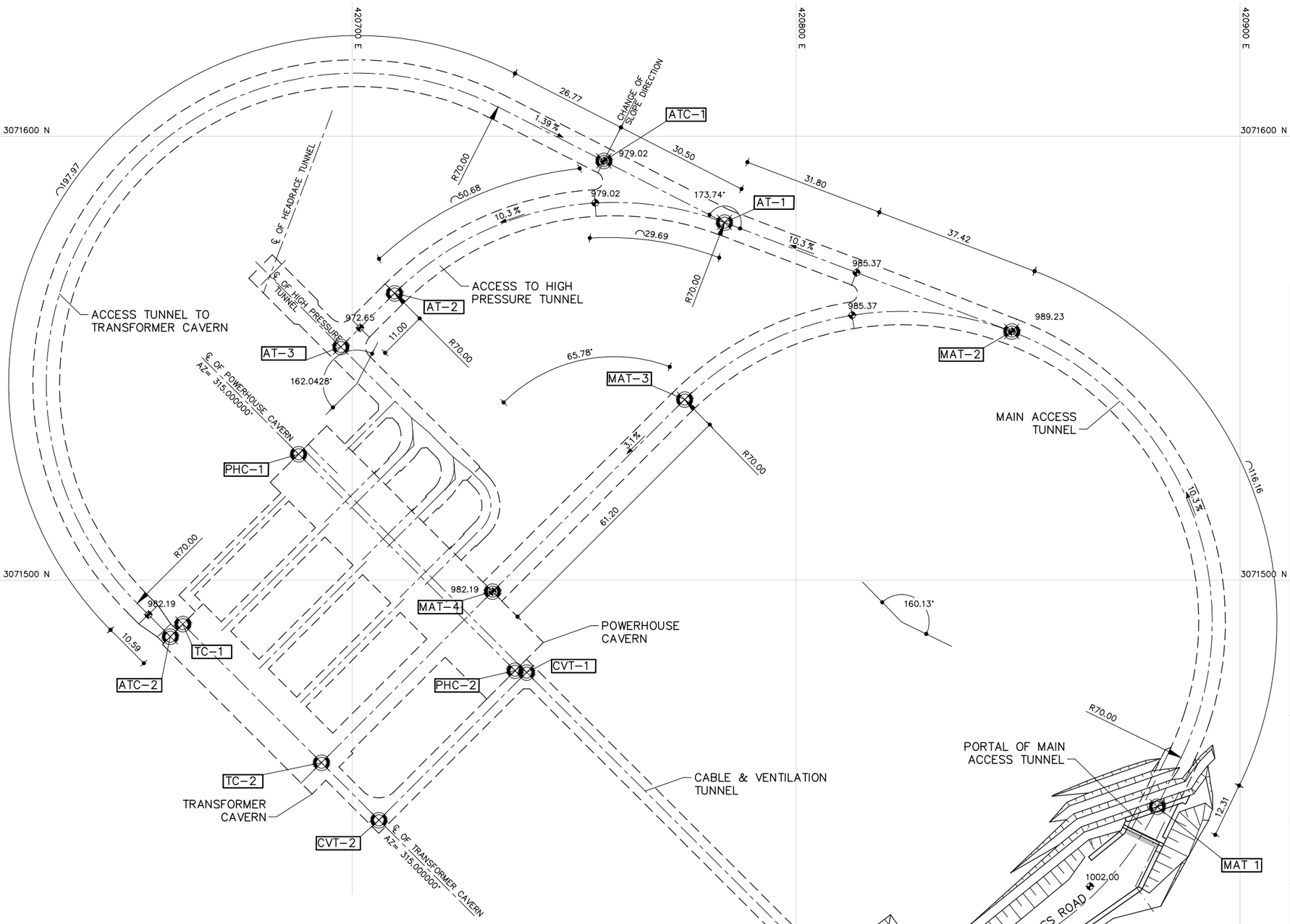
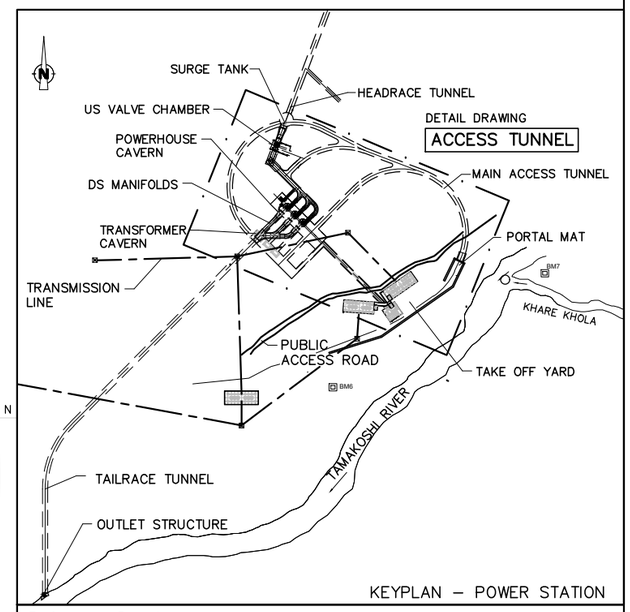


TABLE OF COORDINATES		
CO–ORDINATE POINTS	X–EASTING	Y–NORTHING
MAT–1	420881.350	3071448.987
MAT–2	420848.564	3071556.040
MAT–3	420774.862	3071540.716
MAT–4	420731.588	3071497.443
AT–1	420783.849	3071580.600
AT–2	420709.514	3071564.652
AT–3	420697.420	3071552.559

TABLE OF COORDINATES		
CO–ORDINATE POINTS	X–EASTING	Y–NORTHING
ATC–1	420756.684	3071594.467
ATC–2	420659.010	3071487.302
CVT–1	420739.260	3071479.235
CVT–2	420705.990	3071445.965
TA–1	420817.461	3071401.033
PHC–1	420687.888	3071528.414
PHC–2	420736.679	3071479.623
TC–1	420661.831	3071490.124
TC–2	420693.050	3071458.905



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title

Revisions	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31–00053–DD–4364–Y–0000_–

CAD– File No.:

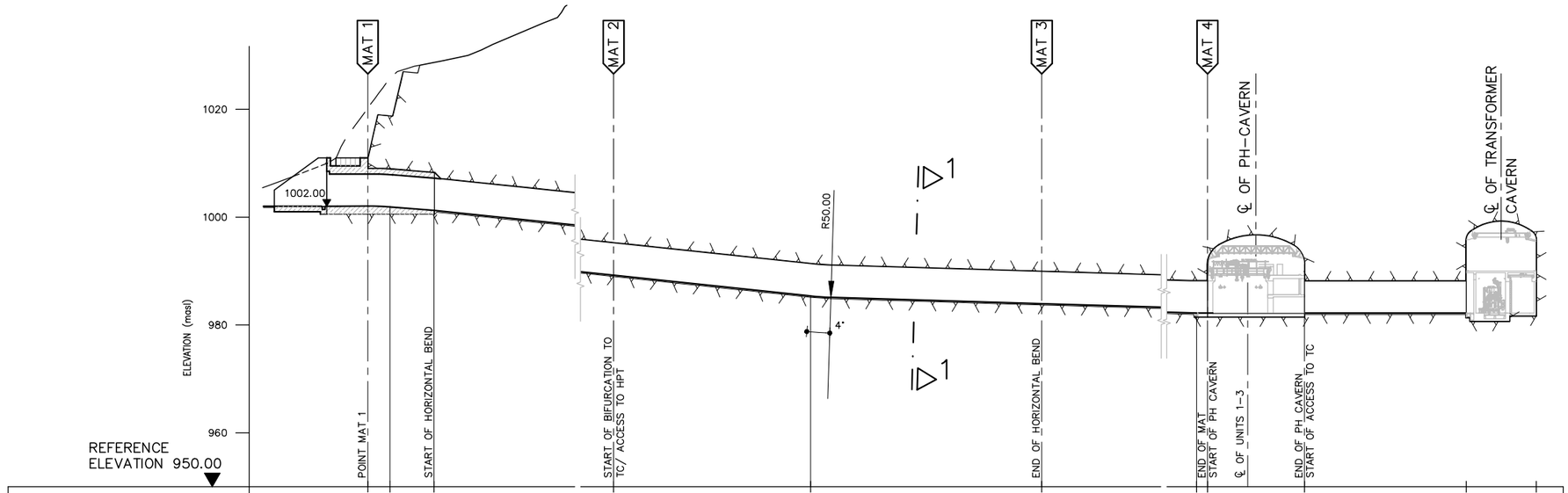
DETAILED DESIGN

POWER STATION
ACCESS TUNNEL AT POWER HOUSE
LAYOUT

PROJECT DRAWING

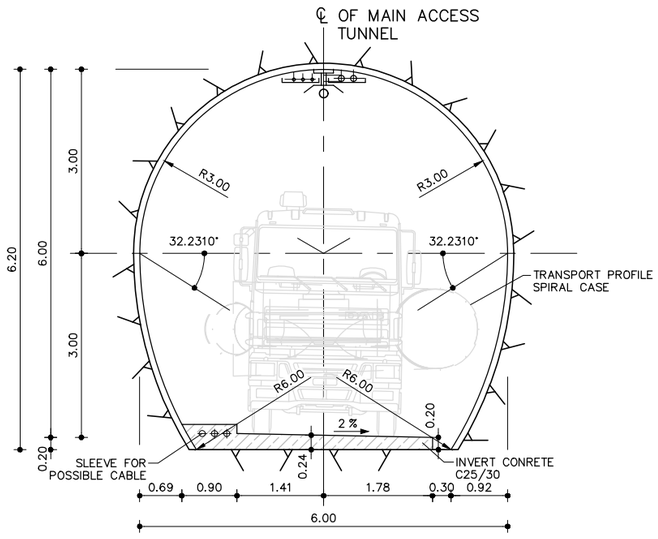
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Drwg. No.: 31–00053–DD–4364–Q 1460 REV. –



CHAINAGE [m]			0+000.00	0+004.11	0+012.31	0+128.47	0+165.03	0+207.94	0+267.14	0+269.14	0+285.14	0+315.14	0+328.14	
LENGTH [m]	HORIZONTAL			4.11	8.20	116.16	36.56	42.92	59.20	2.0	18.00	30.00	13.00	
	TRUE			4.12	8.23	116.77	36.77	42.95	59.22	2.0	18.00	30.00	13.00	
ELEVATION AT INVERT LEVEL OF TUNNEL			1002.08	1001.91	1001.23	989.23	985.37	984.03	982.19	982.19	982.19	982.19	982.19	
VERTICAL ALIGNMENT	S = SLOPE R = RADIUS A = ANGLE AL= ARC LENGTH		R =50m A =4.72° AL=4.12m		S=8.25%	S = 10.3%	S = 10.5%	S = 3.0%	S = 3.0%	S=0%				
HORIZONTAL ALIGNMENT	AZ = AZIMUTH R = RADIUS A = ANGLE TL = TANGENT LENGTH AL = ARC LENGTH	R =70m A =29.1526° TL =18.19m AL =35.62m		AZ=25.856104°	R =70m A =95.0745° AL =116.16m	R =70m A =29.9261° AL =36.56m	R =70m A =35.1287° AL =42.92m	AZ = 225.000000°		AZ =225.000000°				

LONGITUDINAL SECTION
MAIN ACCESS TUNNEL
SCALE 1:1000



SECTION 1-1
TYPICAL CROSS SECTION
SCALE 1:100

LEGEND:

- CONCRETE CLASS C1 – CONCRETE C25/30
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- CONSTRUCTION JOINTS
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT-COORDINATE

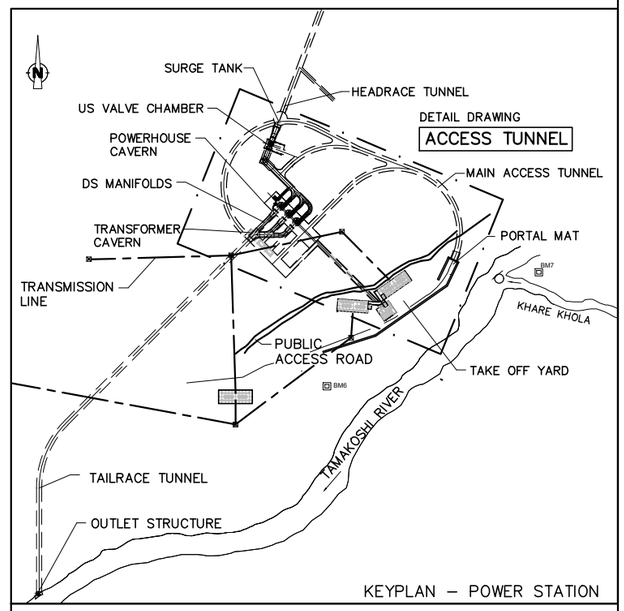
NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO-ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).

DRAFT STATUS: 27.09.2018

SCALE 1:100
−1 0 1 2 3 4 5 [m]

SCALE 1:1000
−10 0 10 20 30 40 50 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31-00053-DD-4364-1460	MAIN ACCESS TUNNEL, LAYOUT AND SECTIONS

Revisions	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31-00053-DD-4364-Y-0000_-

CAD- File No.:

Scale A3: 1:1000/ 100

DETAILED DESIGN

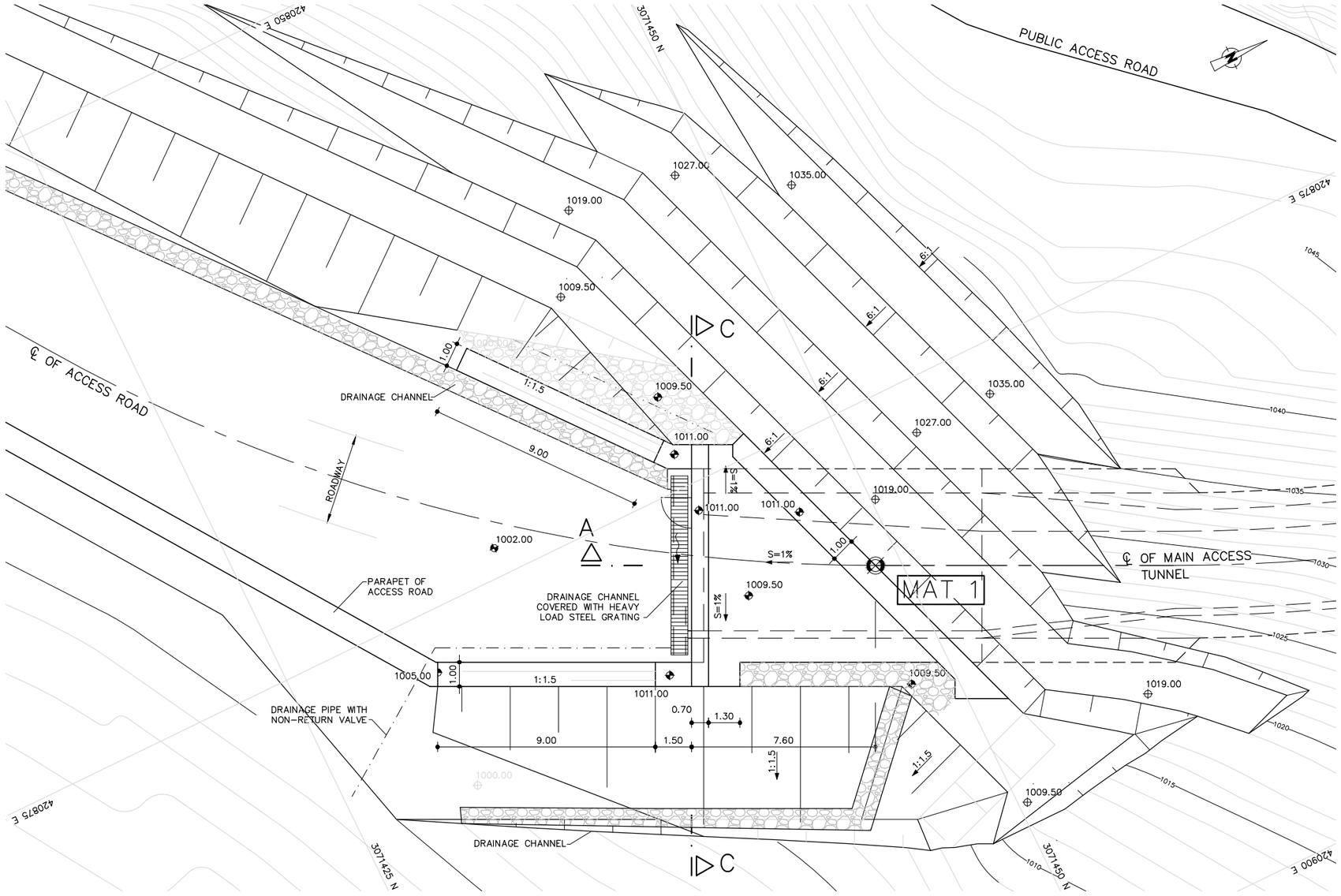
POWER STATION

MAIN ACCESS TUNNEL

LONGITUDINAL AND TYPICAL CROSS SECTION

PROJECT DRAWING

Drwg. No.: 31-00053-DD-4364-Q 1461 REV. –



NOTES:

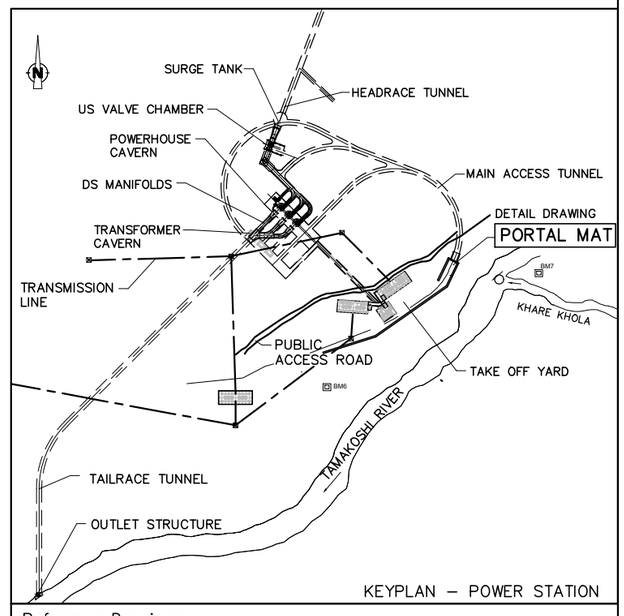
1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO-ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).

LEGEND:

- FINISHED FLOOR LEVEL
- FIXPOINT-COORDINATE

DRAFT STATUS:
27.09.2018

SCALE 1:200
−2 0 2 4 6 8 10 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31-00053-DD-4364-1460	MAIN ACCESS TUNNEL, LAYOUT AND SECTIONS

Revisions

	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
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BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31-00053-DD-4364-Y-0000_-

CAD- File No.:

DETAILED DESIGN

POWER STATION

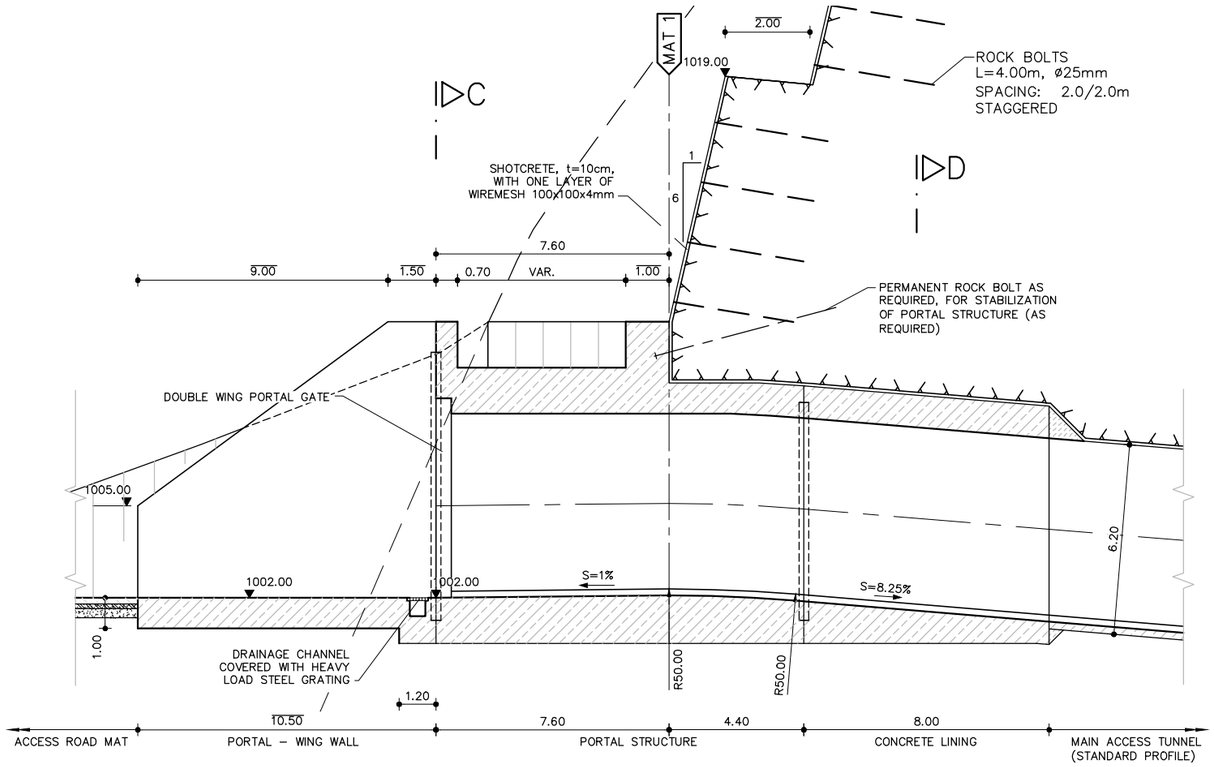
MAIN ACCESS TUNNEL

PORTAL LAYOUT

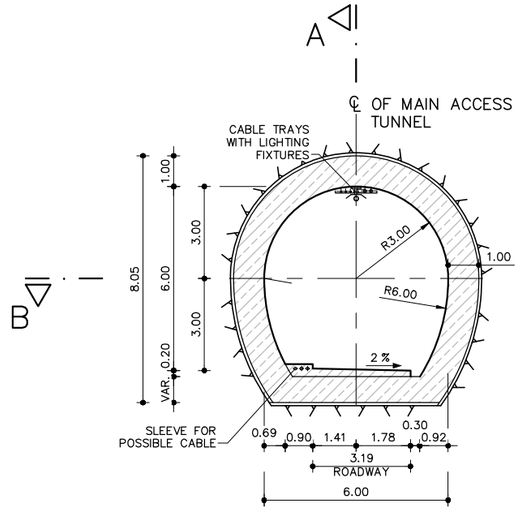
PROJECT DRAWING

Scale A3: 1:200

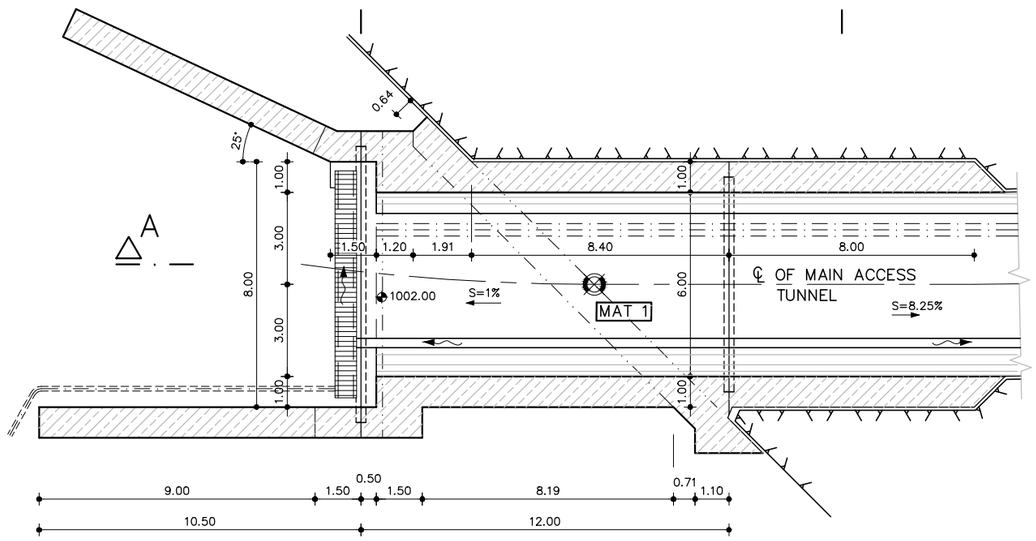
Drwg. No.: 31-00053-DD-4364-Q 1462 REV. –



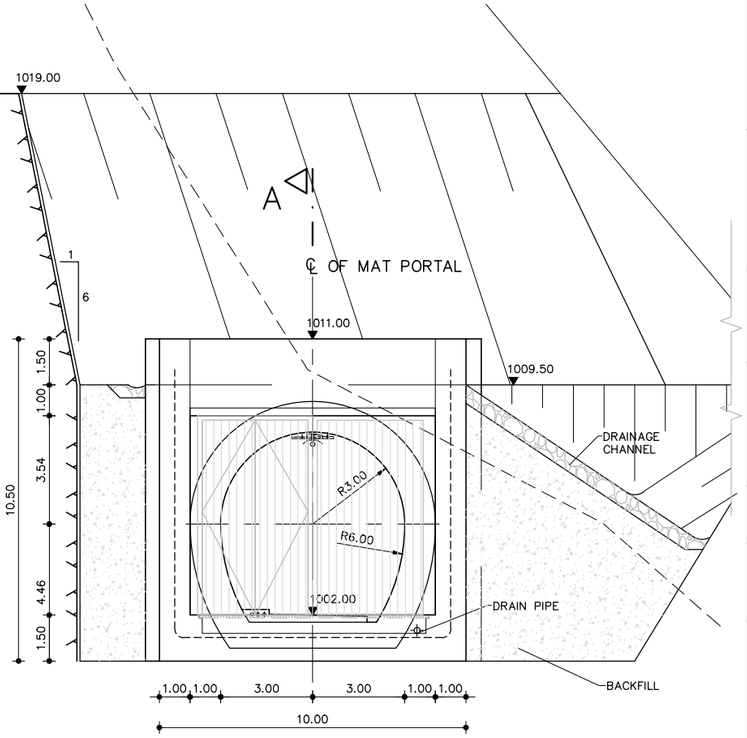
SECTION A–A
THROUGH ℄ OF ACCESS TUNNEL



SECTION D–D
MAT CLOSE TO PORTAL



SECTION B–B
PLAN PORTAL



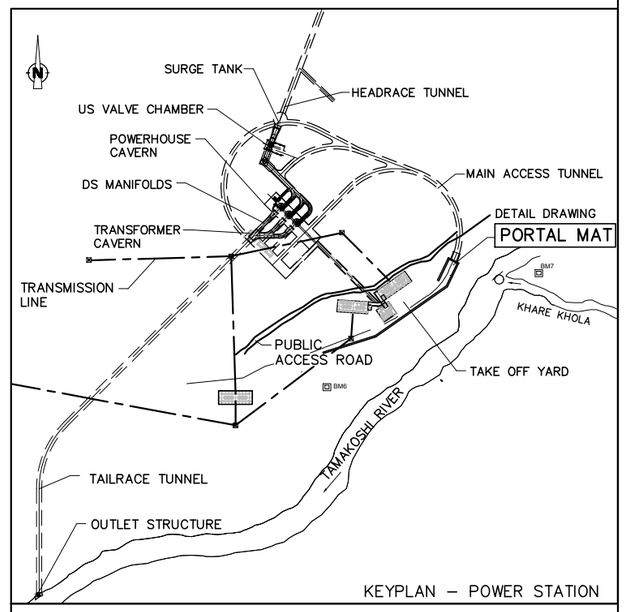
SECTION C–C
VIEW AT PORTAL

NOTES:
1. ALL DIMENSIONS ARE IN METERS [M] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [MASL].

LEGEND:
- CONCRETE CLASS C1 – CONCRETE C25/30
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- CONSTRUCTION JOINTS
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE

DRAFT STATUS:
27.09.2018

SCALE 1:200
–2 0 2 4 6 8 10 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31–00053–DD–4364–1460	MAIN ACCESS TUNNEL, LAYOUT AND SECTIONS

Revisions	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31–00053–DD–4364–Y–0000_–

CAD– File No.:

Scale A3: 1:200

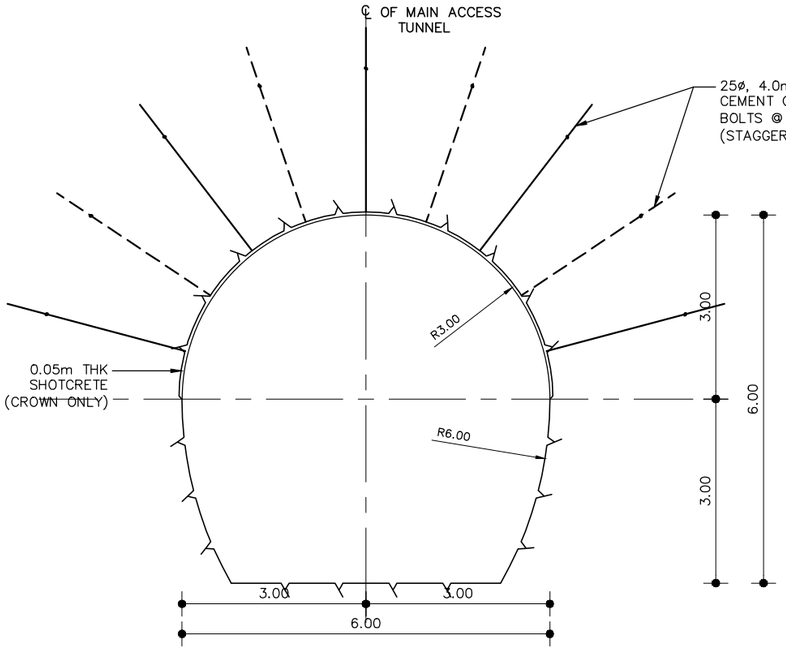
DETAILED DESIGN

POWER STATION
MAIN ACCESS TUNNEL

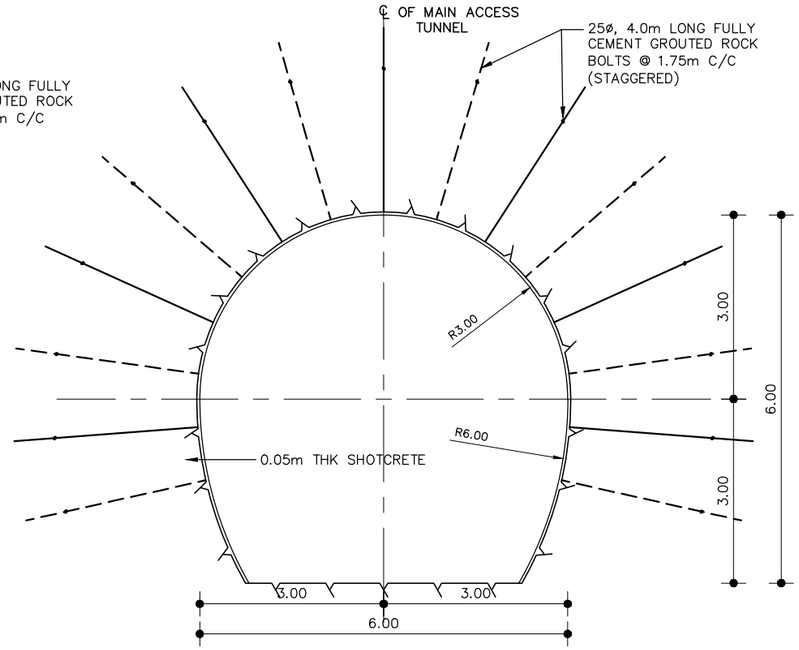
PORTAL SECTIONS

PROJECT DRAWING

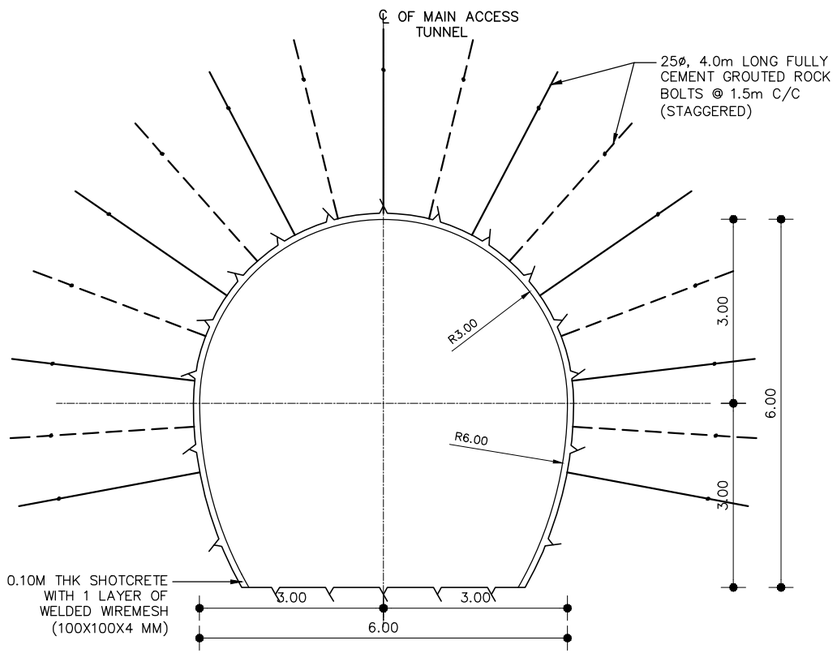
Drwg. No.: 31–00053–DD–4364–Q 1463 REV. –



TYPICAL DETAILS OF SUPPORT SYSTEM FOR ROCK CLASS II



TYPICAL DETAILS OF SUPPORT SYSTEM FOR ROCK CLASS III



TYPICAL DETAILS OF SUPPORT SYSTEM FOR ROCK CLASS IV

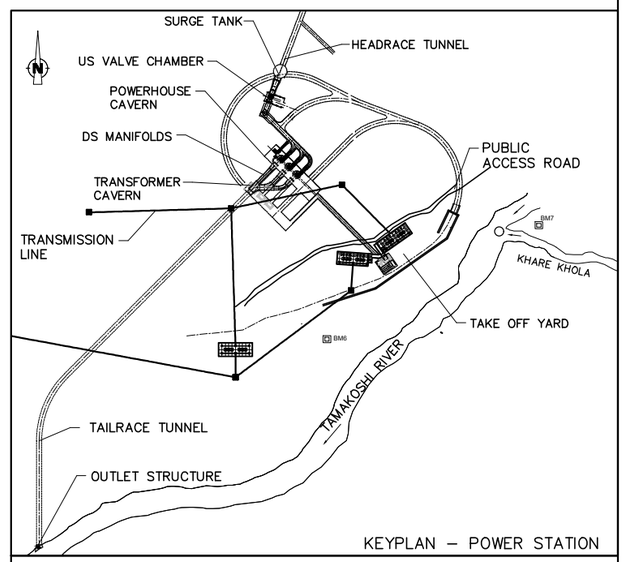
NOTES TO ROCK SUPPORT:

1. ROCK BOLTS SHALL HAVE THE FOLLOWING CHARACTERISTICS:
 - DIA. 25 MM
 - YIELD STRENGTH 500 N/MM²
 - MAXIMUM TENSILE CAPACITY 213 KN
2. THE SHOTCERE MIX SHALL HAVE 28 DAYS OF COMPRESSIVE STRENGTH OF 35MPa.
3. STEEL RIBS SHALL CONFORM TO IS: 226–1975.
4. AN ADDITIONAL LAYER OF 50MM THK PLAIN SHOTCRERE SHALL BE APPLIED ON THE EXPOSED PARTS OF STEEL RIBS FOR PROTECTION AGAINST CORROSION.
5. ROCK SUPPORT MEASURES SHOWN ON THIS DRAWING ARE PRELIMINARY ONLY. FINAL ARRANGEMENT OF ROCK SUPPORT (SHOTCRETE THICKNESSES; LENGTH, ORIENTATION AND GRID OF ROCK BOLTS) HAVE TO BE ADOPTED TO ACTUAL GEOTECHNICAL CONDITIONS, SUBJECT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR.
6. THE APPLICATION OF ROCK SUPPORT CLASSES (RSC) DEPENDS ON THE ACTUALLY ENCOUNTERED CONDITIONS AND GEOTECHNICAL MONITORING AND SHALL BE DECIDED BY THE RESPONSIBLE SECTION ENGINEER/GEOLOGIST.
7. CONTOUR BLASTING HAS TO BE DONE SMOOTHLY WITH MINIMUM DAMAGE TO THE REMAINING ROCKMASS AND AVOIDING OVERBREAKS AS MUCH AS POSSIBLE.
8. BOLT ORIENTATION SHALL BE ADAPTED TO ENCOUNTERED REQUIREMENTS, INSTALLED PERPENDICULAR TO THE ADIT PROFILE, IF DEVIATION FROM VERTICALITY REQUIRED SHALL BE RESTRICTED BELOW 30°.
9. IN AREA WITH LARGE WATER INFLOW (SO THAT FULLY GROUTED–BOLT CANNOT BE PLACED) SWELLEX ANCHORS OF CORRESPONDING ARRANGEMENT COULD BE USED INSTEAD OF TEMPORARY SUPPORT UNTIL THE WATER INFLOW IS REDUCED TO A LEVEL THAT ALLOWS SHOTCRETING AND PLACEMENT BY FULLY GROUTED–BOLTS.
10. DRIPPING OR FLOWING WATER HAS TO BE COLLECTED IN PIPES BEFORE SHOTCRETEING SPECIAL DRAIN HOLES MAY BE REQUIRED (USE SWELLEX BOLT).
11. CONDITIONAL FOREPOLING FOR Q–VALUES <0.10, FOREPOLING UMBRELLA SHALL ADOPT AS PER MIN.: ø25 FULLY GROUTED STEEL BARS, 6m EMBEDDED, 2.0m OVERLAP, 300mm SPACING, 10° ANGLE

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
4. ALL SHOTCRETE SHALL BE PLAIN SHOTCRETE WITH WIREMESH IS ASSIGNED IT ACCORDING TO ROCK SUPPORT.

SCALE 1:100
–1 0 1 2 3 4 5 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31–00053–DD–4364–1460	MAIN ACCESS TUNNEL, LAYOUT AND SECTIONS

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	R. Shrivastava	04.09.18
Drawn	A. K. Basu	04.09.18
Checked	Roloff	04.09.18
Approved	Dr. Moeller	04.09.18

Replaces Drwg. No:

CAD– File No.:

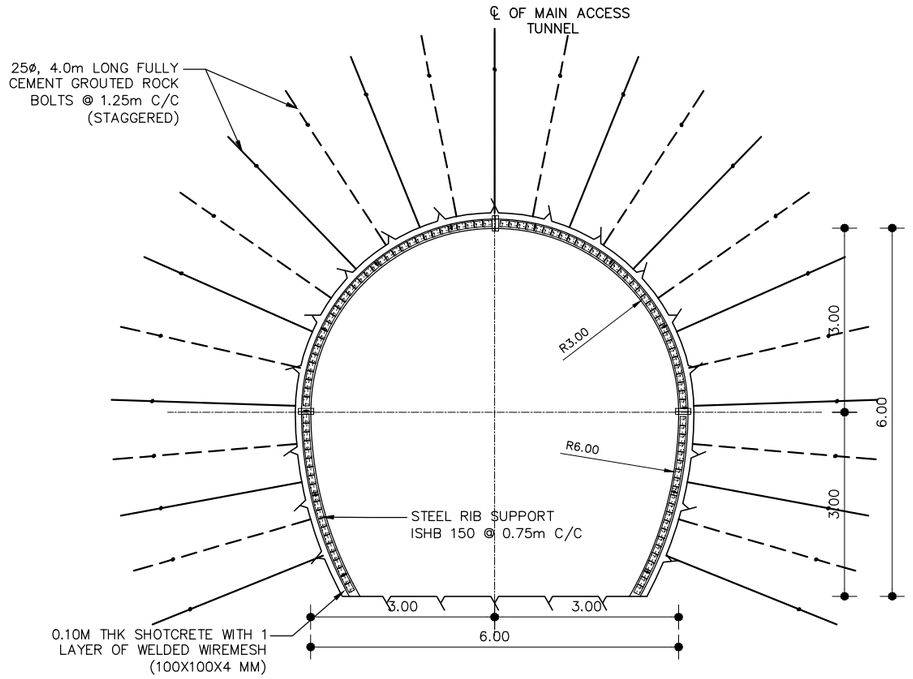
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DETAILED DESIGN

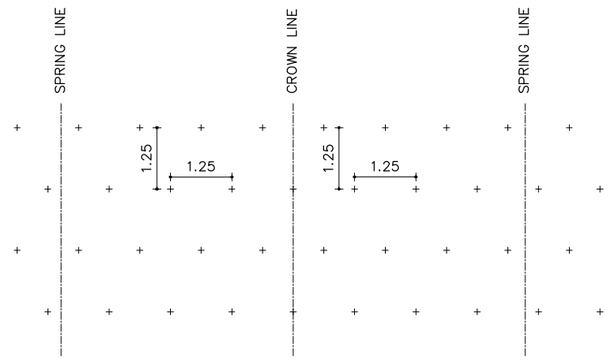
POWER STATION
MAIN ACCESS TUNNEL
EXCAVATION AND ROCK SUPPORT
SHEET 1 OF 2

PROJECT DRAWING

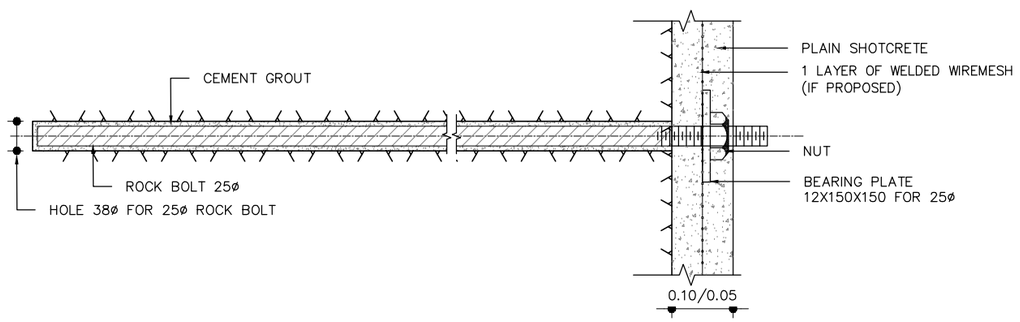
Drwg. No.: 31–00053–DD–4364– S 1465 REV. –



TYPICAL DETAILS OF SUPPORT SYSTEM FOR ROCK CLASS V



TYPICAL DETAILS OF ROCK BOLTS IN CROWN AND WALLS FOR ROCK CLASS V
(DEVELOPED VIEW)
NOT TO SCALE



TYPICAL ROCK BOLT AND SHOTCRETE DETAILS
NOT TO SCALE

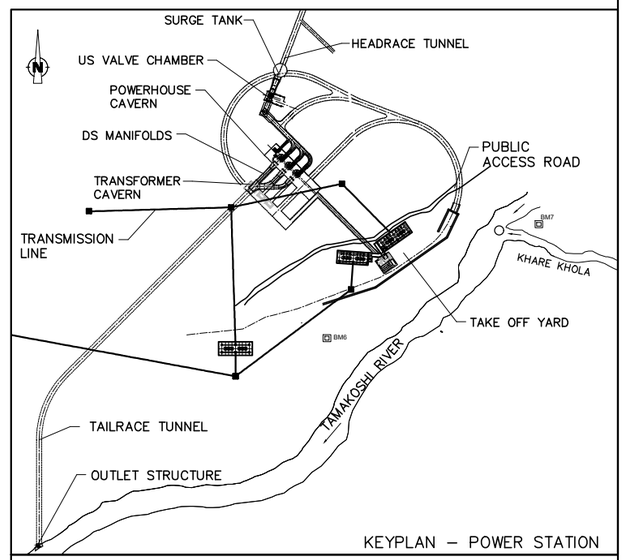
NOTES TO ROCK SUPPORT:

1. ROCK BOLTS SHALL HAVE THE FOLLOWING CHARACTERISTICS:
 - DIA. 25 MM
 - YIELD STRENGTH 500 N/MM²
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8. BOLT ORIENTATION SHALL BE ADAPTED TO ENCOUNTERED REQUIREMENTS, INSTALLED PERPENDICULAR TO THE ADIT PROFILE, IF DEVIATION FROM VERTICALITY REQUIRED SHALL BE RESTRICTED BELOW 30°.
9. IN AREA WITH LARGE WATER INFLOW (SO THAT FULLY GROUTED–BOLT CANNOT BE PLACED) SWELLEX ANCHORS OF CORRESPONDING ARRANGEMENT COULD BE USED INSTEAD OF TEMPORARY SUPPORT UNTIL THE WATER INFLOW IS REDUCED TO A LEVEL THAT ALLOWS SHOTCRETING AND PLACEMENT BY FULLY GROUTED–BOLTS.
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NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
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SCALE 1:100
–1 0 1 2 3 4 5 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31–00053–DD–4364–1460	MAIN ACCESS TUNNEL, LAYOUT AND SECTIONS

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	R. Shrivastava	04.09.18
Drawn	A. K. Basu	04.09.18
Checked	Roloff	04.09.18
Approved	Dr. Moeller	04.09.18

Replaces Drwg. No:
31–00053–DD–4364–Y–0000_–

CAD– File No.:

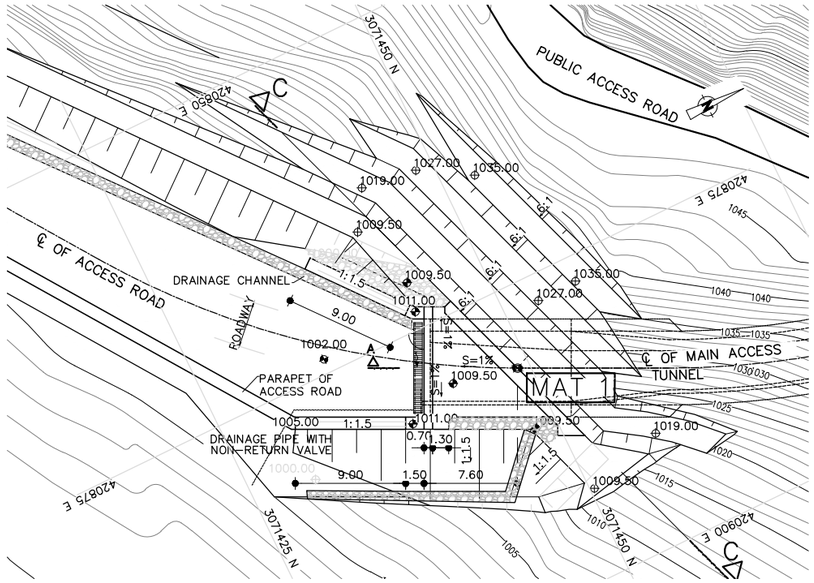
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DETAILED DESIGN

POWER STATION
MAIN ACCESS TUNNEL
EXCAVATION AND ROCK SUPPORT
SHEET 2 OF 2

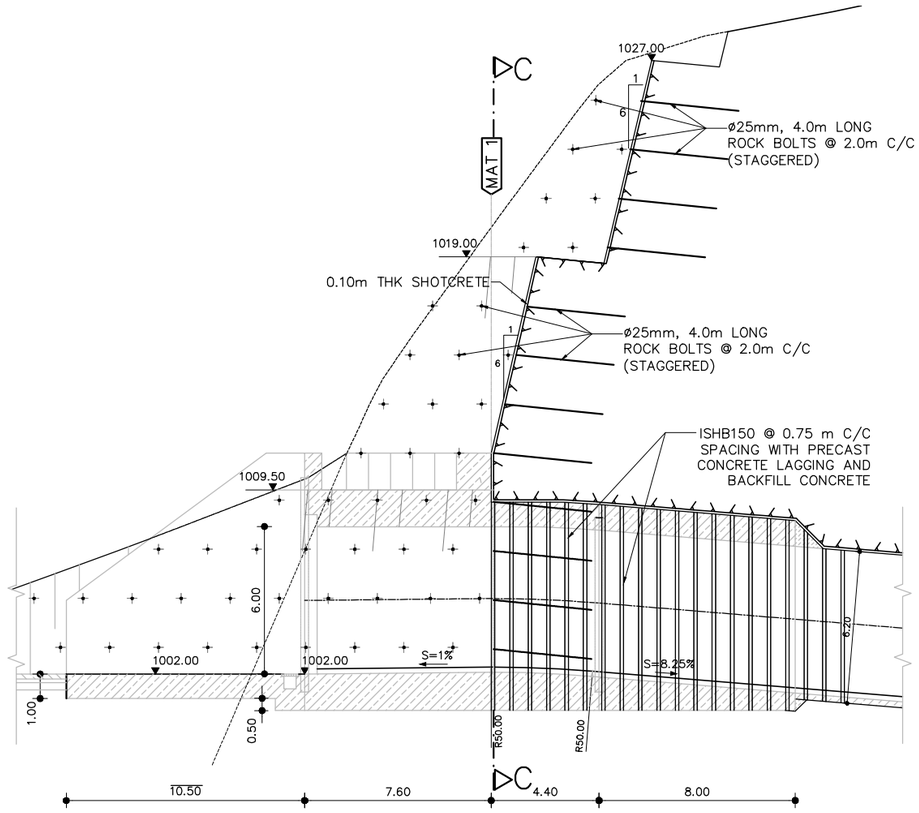
PROJECT DRAWING

Drwg. No.: 31–00053–DD–4364– S 1465 REV. –



LAYOUT OF MAT PORTAL

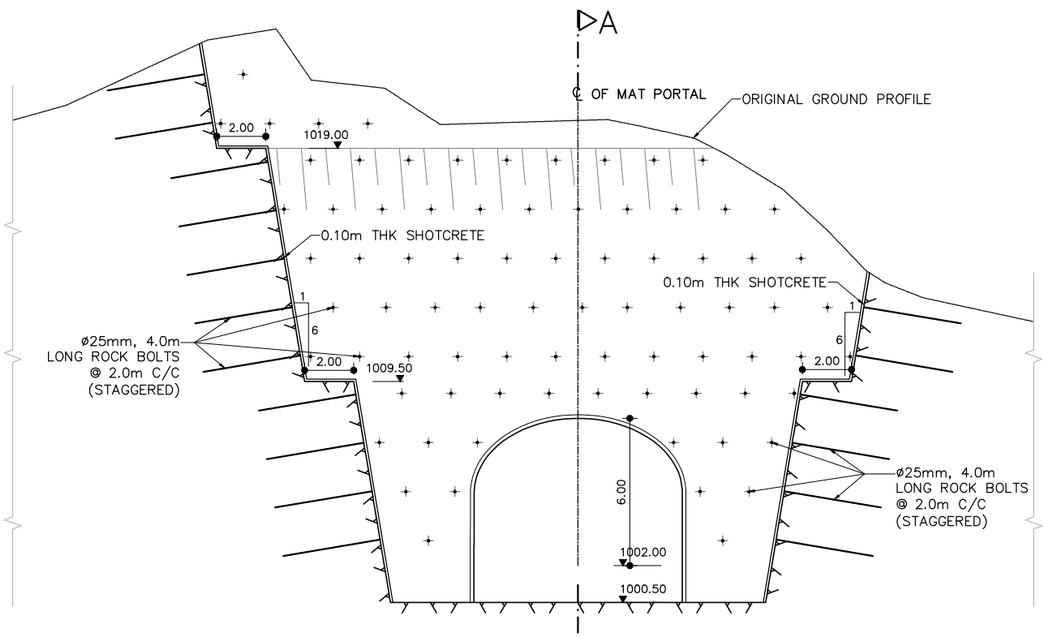
SCALE 1:500



SECTION A–A

THROUGH ℄ OF ACCESS TUNNEL

SCALE 1:250



SECTION C–C

VIEW AT PORTAL

SCALE 1:250

NOTES TO ROCK SUPPORT:

1. ROCK BOLTS SHALL HAVE THE FOLLOWING CHARACTERISTICS:
 - DIA. 25 MM
 - YIELD STRENGTH 500 N/MM²
 - MAXIMUM TENSILE CAPACITY 213 KN
2. THE SHOTCERE MIX SHALL HAVE 28 DAYS OF COMPRESSIVE STRENGTH OF 35MPa.
3. STEEL RIBS SHALL CONFORM TO IS:226–1975.
4. AN ADDITIONAL LAYER OF 50MM THK PLAIN SHOTCRERE SHALL BE APPLIED ON THE EXPOSED PARTS OF STEEL RIBS FOR PROTECTION AGAINST CORROSION.
5. ROCK SUPPORT MEASURES SHOWN ON THIS DRAWING ARE PRELIMINARY ONLY. FINAL ARRANGEMENT OF ROCK SUPPORT (SHOTCRETE THICKNESSES; LENGTH, ORIENTATION AND GRID OF ROCK BOLTS) HAVE TO BE ADOPTED TO ACTUAL GEOTECHNICAL CONDITIONS, SUBJECT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR.
6. THE APPLICATION OF ROCK SUPPORT CLASSES (RSC) DEPENDS ON THE ACTUALLY ENCOUNTERED CONDITIONS AND GEOTECHNICAL MONITORING AND SHALL BE DECIDED BY THE RESPONSIBLE SECTION ENGINEER/GEOLOGIST.
7. CONTOUR BLASTING HAS TO BE DONE SMOOTHLY WITH MINIMUM DAMAGE TO THE REMAINING ROCKMASS AND AVOIDING OVERBREAKS AS MUCH AS POSSIBLE.
8. BOLT ORIENTATION SHALL BE ADAPTED TO ENCOUNTERED REQUIREMENTS, INSTALLED PERPENDICULAR TO THE ADIT PROFILE, IF DEVIATION FROM VERTICALITY REQUIRED SHALL BE RESTRICTED BELOW 30°.
9. IN AREA WITH LARGE WATER INFLOW (SO THAT FULLY GROUTED–BOLT CANNOT BE PLACED) SWELLEX ANCHORS OF CORRESPONDING ARRANGEMENT COULD BE USED INSTEAD OF TEMPORARY SUPPORT UNTIL THE WATER INFLOW IS REDUCED TO A LEVEL THAT ALLOWS SHOTCRETING AND PLACEMENT BY FULLY GROUTED–BOLTS.
10. DRIPPING OR FLOWING WATER HAS TO BE COLLECTED IN PIPES BEFORE SHOTCRETEING SPECIAL DRAIN HOLES MAY BE REQUIRED (USE SWELLEX BOLT).
11. CONDITIONAL FOREPOLING FOR Q–VALUES <0.10, FOREPOLING UMBRELLA SHALL ADOPT AS PER MIN.: ø25 FULLY GROUTED STEEL BARS, 6m EMBEDDED, 2.0m OVERLAP, 300mm SPACING, 10° ANGLE

NOTES:

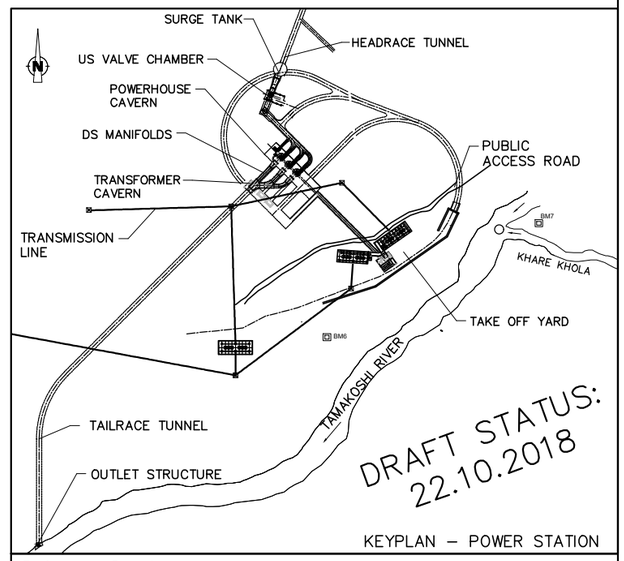
1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
4. ALL SHOTCRETE SHALL BE PLAIN SHOTCRETE WITH WIREMESH IF ASSIGNED IT ACCORDING TO ROCK SUPPORT.

SCALE 1:250

−2.5 0 2.5 5 7.5 10 12.5 [m]

SCALE 1:500

−5 0 5 10 15 20 25 [m]



DRAFT STATUS: 22.10.2018

KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31–00053–DD–4364–Q–1460	POWERSTATION, ACCESS TUNNEL TO POWERHOUSE, PLAN

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL

CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT

DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	R. Shrivastava	26.09.18
Drawn	A K Basu	26.09.18
Checked	Roloff	26.09.18
Approved	Dr. Moeller	26.09.18

Replaces Drwg. No: 31–00053–DD–4364–Y–0000_–

CAD– File No.:

DETAILED DESIGN

POWER STATION

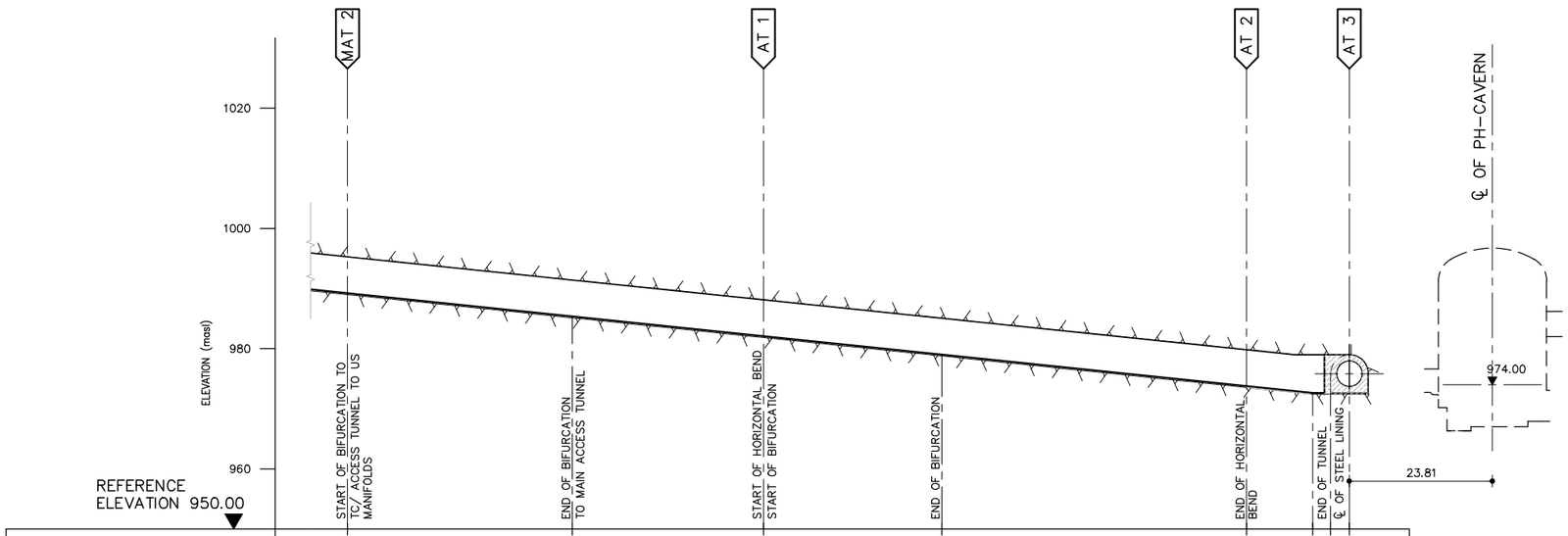
MAIN ACCESS TUNNEL (MAT)

EXCAVATION AND ROCK SUPPORT DETAILS OF MAT PORTAL

PROJECT DRAWING

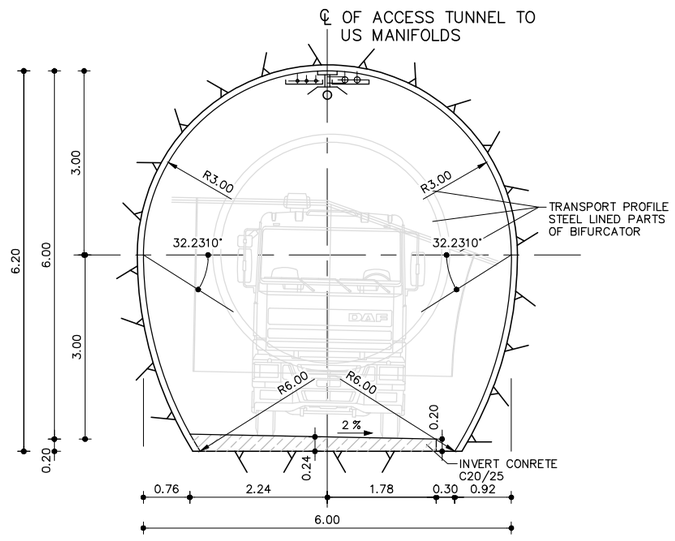
Scale A3: 1:250, 1:500

Drwg. No.: 31–00053–DD–4364– S 1466 REV. –



CHAINAGE [m]		0+000.00	0+037.42	0+069.22	0+098.91	0+149.59	0+160.62	0+163.59	0+166.69
LENGTH [m]	HORIZONTAL		37.42	31.80	29.69	50.68	11.03	2.07	
	TRUE		37.62	31.97	29.85	50.95	11.09	2.07	
ELEVATION AT INVERT LEVEL OF TUNNEL		989.23	985.37	982.09	979.02	973.79	972.65	972.45 EXCAV. LEVEL	
VERTICAL ALIGNMENT	S = SLOPE R = RADIUS A = ANGLE AL= ARC LENGTH		S = 10.3%	S = 10.3%	S = 10.3%	S = 10.3%	S=10.3%	S=0.0%	
HORIZONTAL ALIGNMENT	AZ = AZIMUTH R = RADIUS A = ANGLE TL = TANGENT LENGTH AL = ARC LENGTH		AZ = 290.782725°	AZ = 290.782725°	R = 70m A = 24.3000° AL= 29.69m	R = 70m A = 41.4827° AL= 50.68m	AZ=225.000000°		

LONGITUDINAL SECTION
ACCESS TO HIGH PRESSURE TUNNEL
SCALE 1:1000



SECTION 1–1
ACCESS TUNNEL TO US MANIFOLDS
SCALE 1:100

LEGEND:

- CONCRETE CLASS C1 – CONCRETE C25/30
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- CONSTRUCTION JOINTS
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE

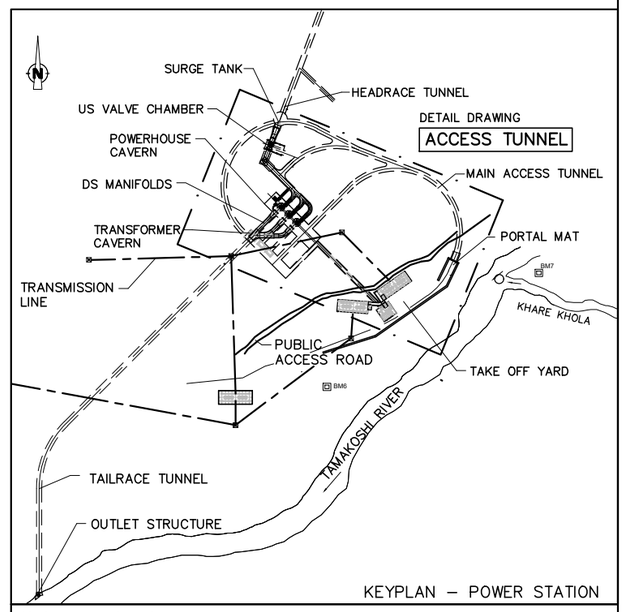
NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO–ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).

DRAFT STATUS: 27.09.2018

SCALE 1:100
−1 0 1 2 3 4 5 [m]

SCALE 1:1000
−10 0 10 20 30 40 50 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31–00053–DD–4364–Q–1460	ACCESS TUNNEL AT POWERHOUSE, LAYOUT

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31–00053–DD–4364–Y–0000_–

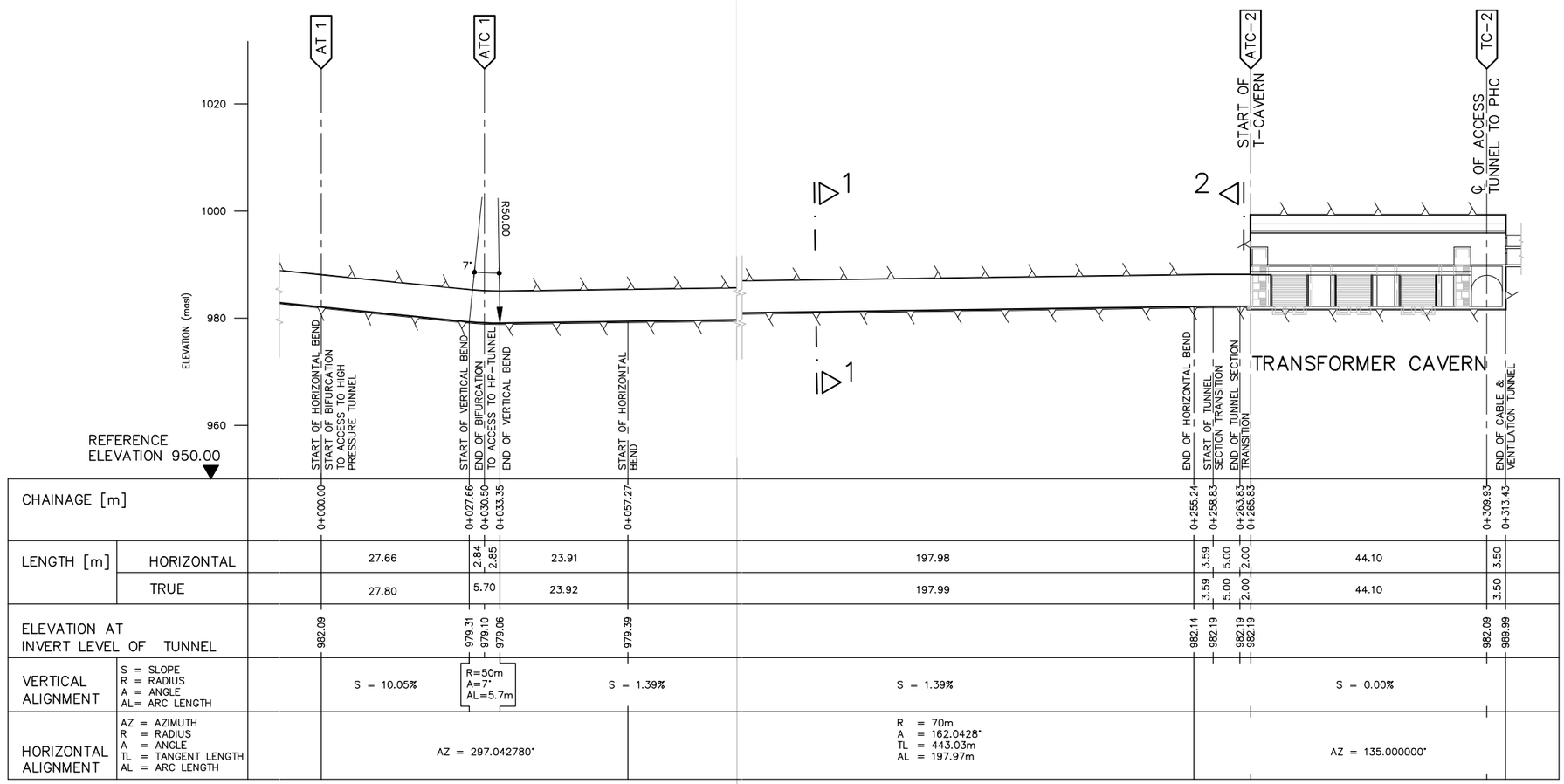
CAD– File No.:

DETAILED DESIGN

POWER STATION
ACCESS TO HIGH PRESSURE TUNNEL
LONGITUDINAL AND TYPICAL CROSS SECTION
PROJECT DRAWING

Scale A3: 1:1000, 1:100

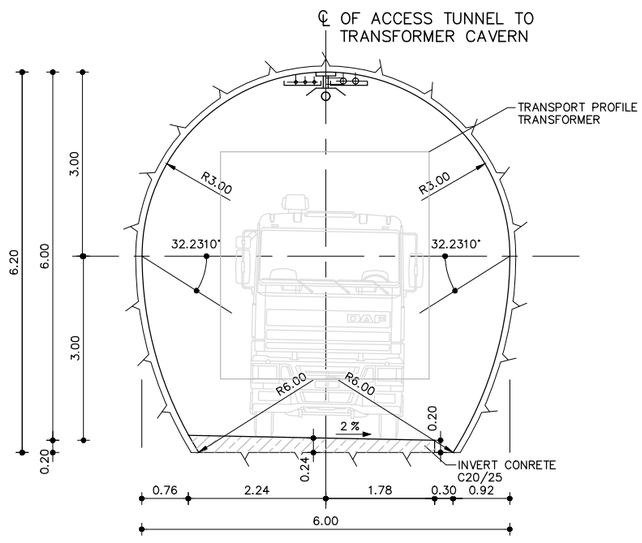
Drwg. No.: 31–00053–DD–4364–Q 1470 REV. –



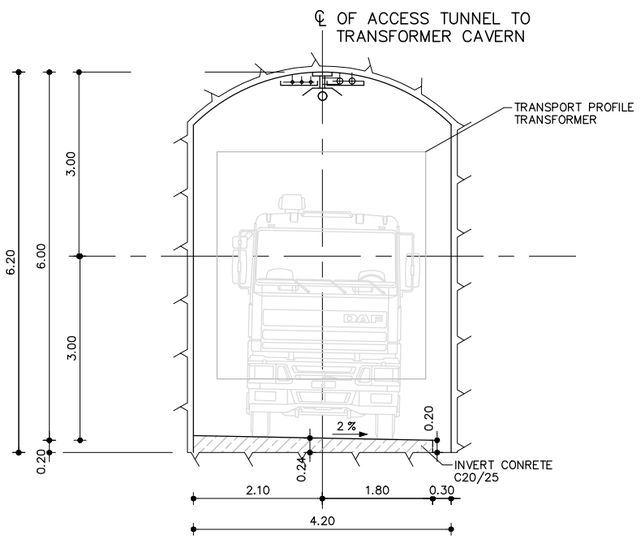
REFERENCE ELEVATION 950.00

CHAINAGE [m]		0+000.00			0+027.66	0+030.50	0+033.35		0+057.27					0+255.24	0+258.83	0+263.83	0+265.83			0+309.93	0+313.43			
LENGTH [m]	HORIZONTAL		27.66			2.84	2.85	23.91			197.98				3.59	5.00	2.00	44.10			3.50			
	TRUE		27.80			5.70		23.92			197.99				3.59	5.00	2.00	44.10			3.50			
ELEVATION AT INVERT LEVEL OF TUNNEL		982.09			979.31	979.10	979.06		979.39					982.14	982.19	982.19	982.19			982.09	989.99			
VERTICAL ALIGNMENT	S = SLOPE R = RADIUS A = ANGLE AL= ARC LENGTH		S = 10.05%			R=50m A=7° AL=5.7m			S = 1.39%						S = 1.39%						S = 0.00%			
HORIZONTAL ALIGNMENT	AZ = AZIMUTH R = RADIUS A = ANGLE TL = TANGENT LENGTH AL = ARC LENGTH		AZ = 297.042780°								R = 70m A = 162.0428° TL = 443.03m AL = 197.97m										AZ = 135.000000°			

LONGITUDINAL SECTION
ACCESS TO HIGH PRESSURE TUNNEL
SCALE 1:1000



SECTION 1–1
ACCESS TUNNEL TO TRANSFORMER CAVERN
SCALE 1:100



SECTION 2–2
ACCESS TUNNEL AT TRANSFORMER CAVERN
SCALE 1:100

LEGEND:

- CONCRETE CLASS C1 – CONCRETE C25/30
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- CONSTRUCTION JOINTS
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE

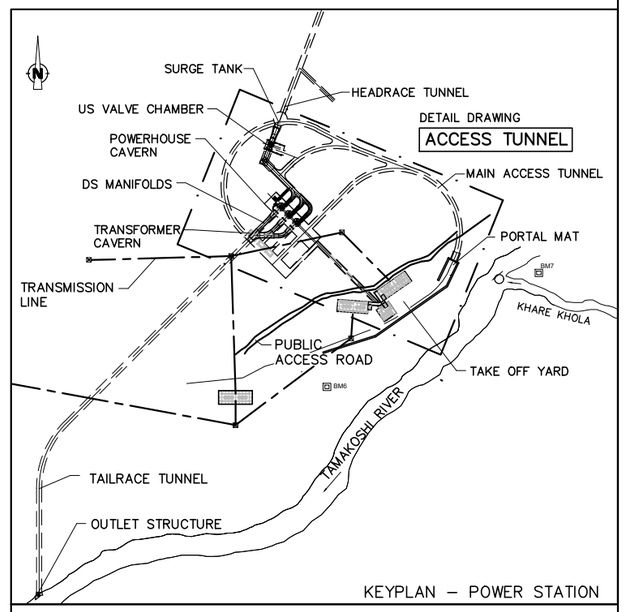
NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO–ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).

DRAFT STATUS: 03.10.2018

SCALE 1:100
−1 0 1 2 3 4 5 [m]

SCALE 1:1000
−10 0 10 20 30 40 50 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31–00053–DD–4364–Q–1460	ACCESS TUNNEL AT POWERHOUSE, LAYOUT AND SECTIONS

Revisions			
	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No: 31–00053–DD–4364–Y–0000_–

CAD– File No.:

DETAILED DESIGN

POWER STATION

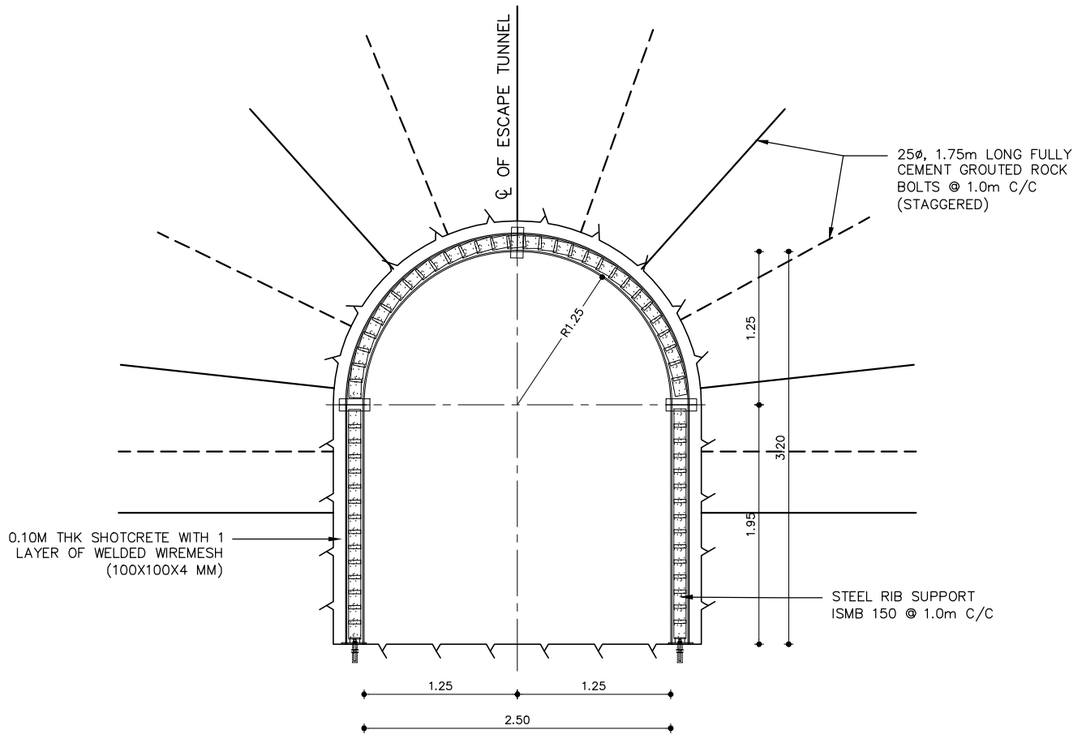
ACCESS TUNNEL TO TRANSFORMER CAVERN

LONGITUDINAL AND TYPICAL CROSS SECTIONS

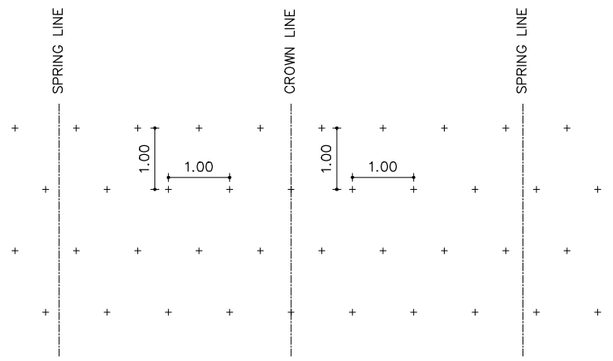
PROJECT DRAWING

Scale A3: 1:1000, 1:100

Drwg. No.: 31–00053–DD–4364–Q 1475 REV. –



TYPICAL DETAILS OF SUPPORT SYSTEM

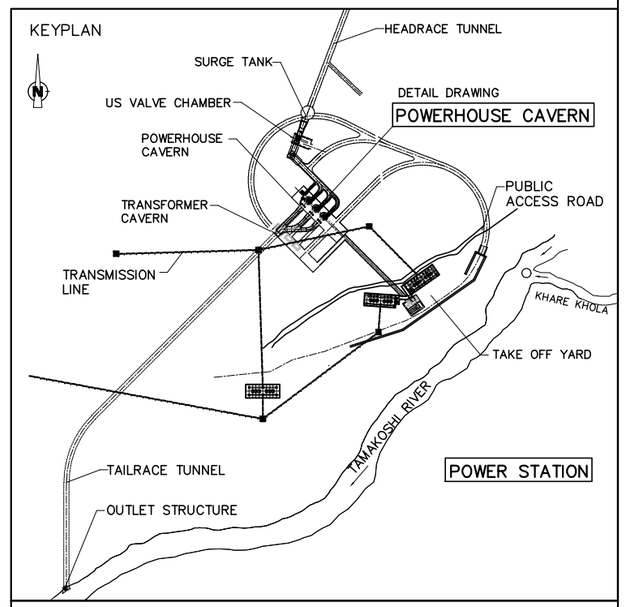


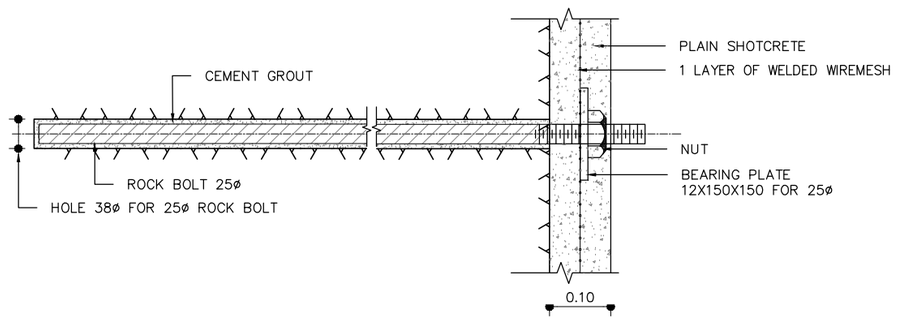
TYPICAL DETAILS OF ROCK BOLTS IN CROWN AND WALLS
(DEVELOPED VIEW)

NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
4. ALL SHOTCRETE SHALL BE PLAIN SHOTCRETE WITH WIREMESH IF ASSIGNED IT ACCORDING TO ROCK SUPPORT.

SCALE 1:50
−0.5 0 0.5 1 1.5 2 2.5 [m]





TYPICAL ROCK BOLT AND SHOTCRETE DETAILS
NOT TO SCALE

NOTES TO ROCK SUPPORT:

1. ROCK BOLTS SHALL HAVE THE FOLLOWING CHARACTERISTICS:
 - DIA. 25 MM
 - YIELD STRENGTH 500 N/MM²
 - MAXIMUM TENSILE CAPACITY 213 KN
2. THE SHOTCERE MIX SHALL HAVE 28 DAYS OF COMPRESSIVE STRENGTH OF 35MPa.
3. STEEL RIBS SHALL CONFORM TO IS: 226−1975.
4. AN ADDITIONAL LAYER OF 50MM THK PLAIN SHOTCRERE SHALL BE APPLIED ON THE EXPOSED PARTS OF STEEL RIBS FOR PROTECTION AGAINST CORROSION.
5. ROCK SUPPORT MEASURES SHOWN ON THIS DRAWING ARE PRELIMINARY ONLY. FINAL ARRANGEMENT OF ROCK SUPPORT (SHOTCRETE THICKNESSES; LENGTH, ORIENTATION AND GRID OF ROCK BOLTS) HAVE TO BE ADOPTED TO ACTUAL GEOTECHNICAL CONDITIONS, SUBJECT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR.
6. THE APPLICATION OF ROCK SUPPORT CLASSES (RSC) DEPENDS ON THE ACTUALLY ENCOUNTERED CONDITIONS AND GEOTECHNICAL MONITORING AND SHALL BE DECIDED BY THE RESPONSIBLE SECTION ENGINEER/GEOLOGIST.
7. CONTOUR BLASTING HAS TO BE DONE SMOOTHLY WITH MINIMUM DAMAGE TO THE REMAINING ROCKMASS AND AVOIDING OVERBREAKS AS MUCH AS POSSIBLE.
8. BOLT ORIENTATION SHALL BE ADAPTED TO ENCOUNTERED REQUIREMENTS, INSTALLED PERPENDICULAR TO THE ADIT PROFILE, IF DEVIATION FROM VERTICALITY REQUIRED SHALL BE RESTRICTED BELOW 30°.
9. IN AREA WITH LARGE WATER INFLOW (SO THAT FULLY GROUTED−BOLT CANNOT BE PLACED) SWELLEX ANCHORS OF CORRESPONDING ARRANGEMENT COULD BE USED INSTEAD OF TEMPORARY SUPPORT UNTIL THE WATER INFLOW IS REDUCED TO A LEVEL THAT ALLOWS SHOTCRETING AND PLACEMENT BY FULLY GROUTED−BOLTS.
10. DRIPPING OR FLOWING WATER HAS TO BE COLLECTED IN PIPES BEFORE SHOTCRETEING SPECIAL DRAIN HOLES MAY BE REQUIRED (USE SWELLEX BOLT).
11. CONDITIONAL FOREPOLING FOR Q−VALUES <0.10, FOREPOLING UMBRELLA SHALL ADOPT AS PER MIN.: ø25 FULLY GROUTED STEEL BARS, 6m EMBEDDED, 2.0m OVERLAP, 300mm SPACING, 10° ANGLE

Reference Drawings

Drwg. No.	Title

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	R. Shrivastava	21.09.18
Drawn	A. K. Basu	21.09.18
Checked	Roloff	21.09.18
Approved	Dr. Moeller	21.09.18

Replaces Drwg. No: 31−00053−DD−4364−Y−0000_−

CAD− File No.:

Scale A3: 1:50

DETAILED DESIGN

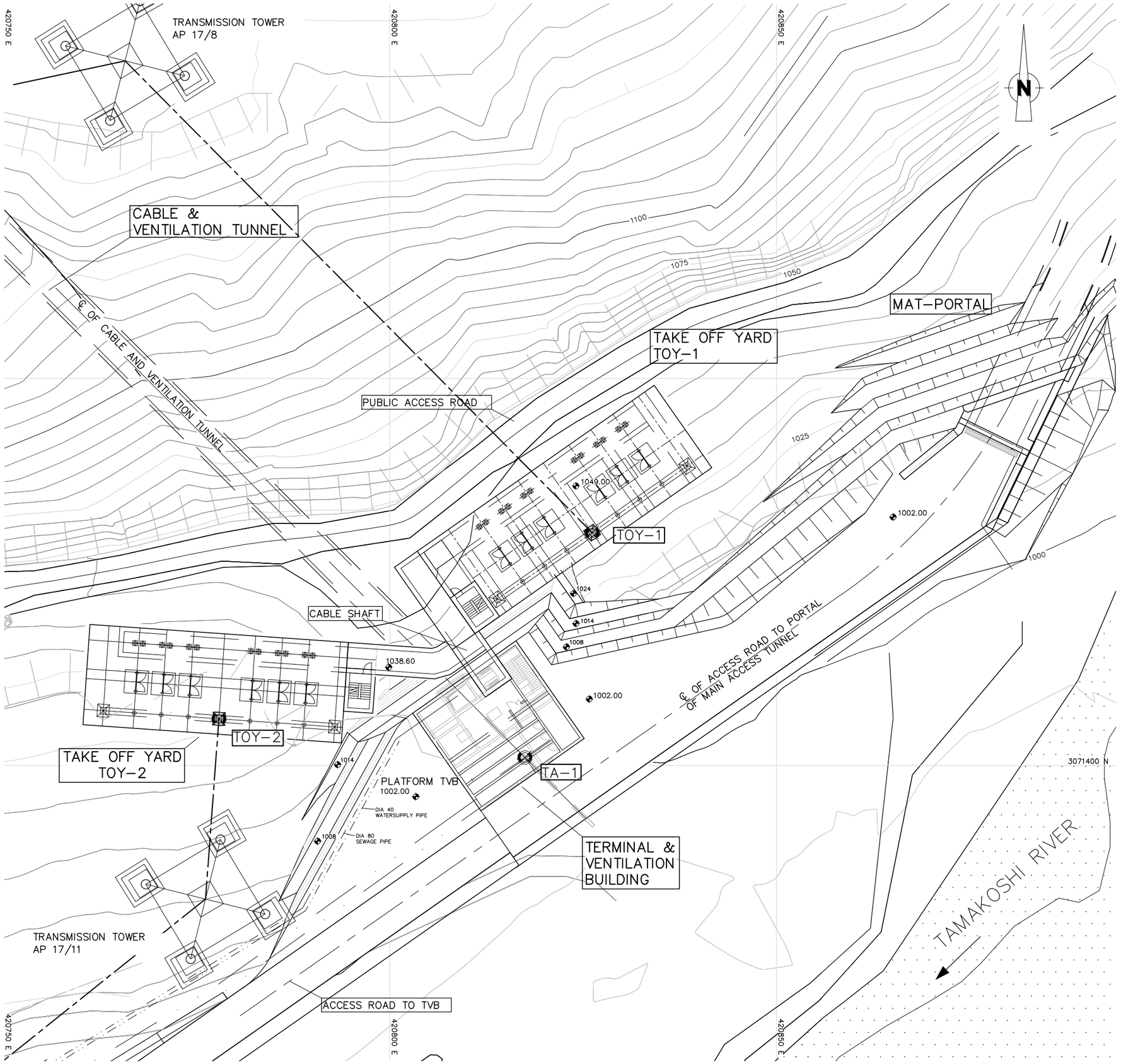
POWER STATION

ESCAPE GALLERY

EXCAVATION AND SUPPORT SYSTEM DETAILS

PROJECT DRAWING

Drwg. No.: 31−00053−DD−4387− S 1485 REV. −



NOTES:

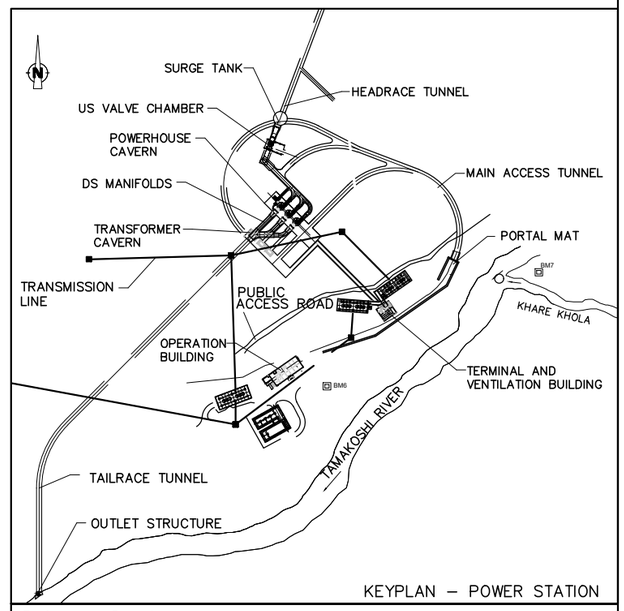
1. ALL DIMENSIONS ARE IN METERS [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO–ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).

DRAFT STATUS:
29.10.2018

LEGEND:

AZ AZIMUTH [°]
ELEVATION
FIX POINT

SCALE 1:500
–5 0 5 10 15 20 25 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31–00053–DD–4390–1491	TERMINAL AND VENTILATION BUILDING, SECTIONS

Revisions			
	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	31.07.17
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:

CAD– File No.:

Scale A3: 1:500

DETAILED DESIGN

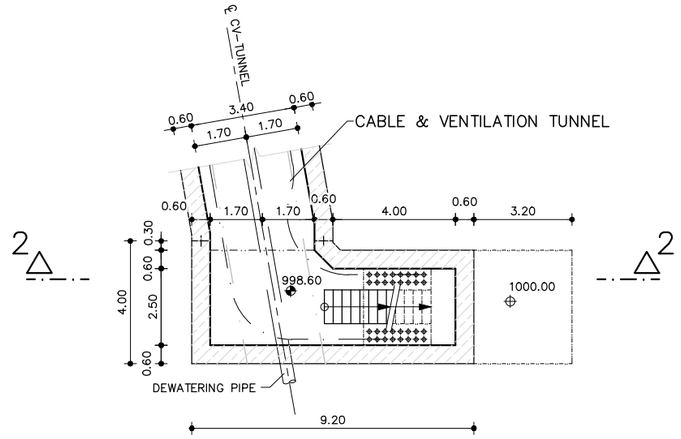
POWER STATION

TERMINAL & VENTILATION BUILDING

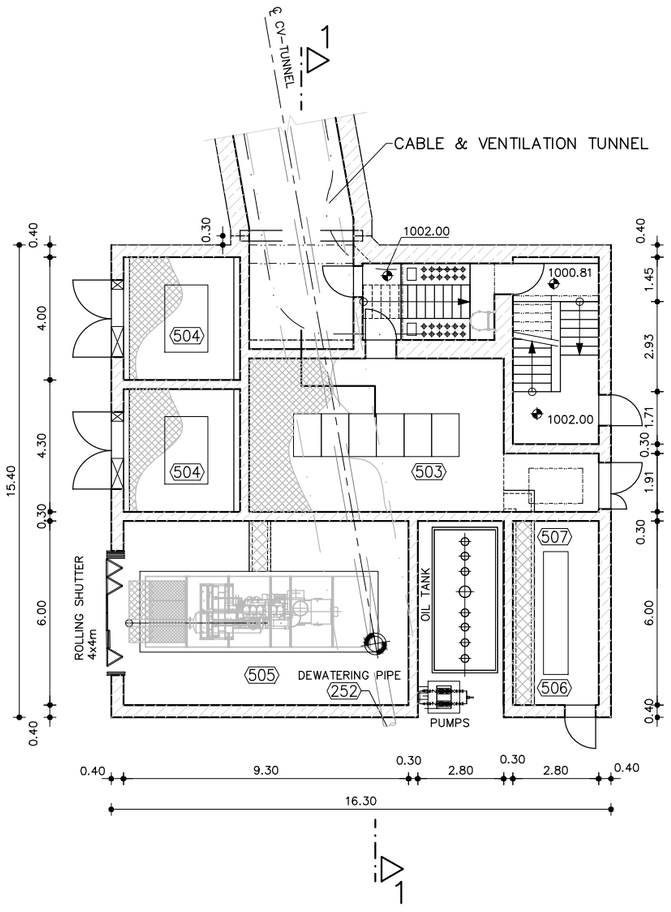
LAYOUT

PROJECT DRAWING

Drwg. No.: 31–00053–DD–4390–Q 1490 REV. –



CABLE FLOOR
PLAN EL. 998.60



ELECTRICAL FLOOR
PLAN EL. 1002.00

EQUIPMENT LIST

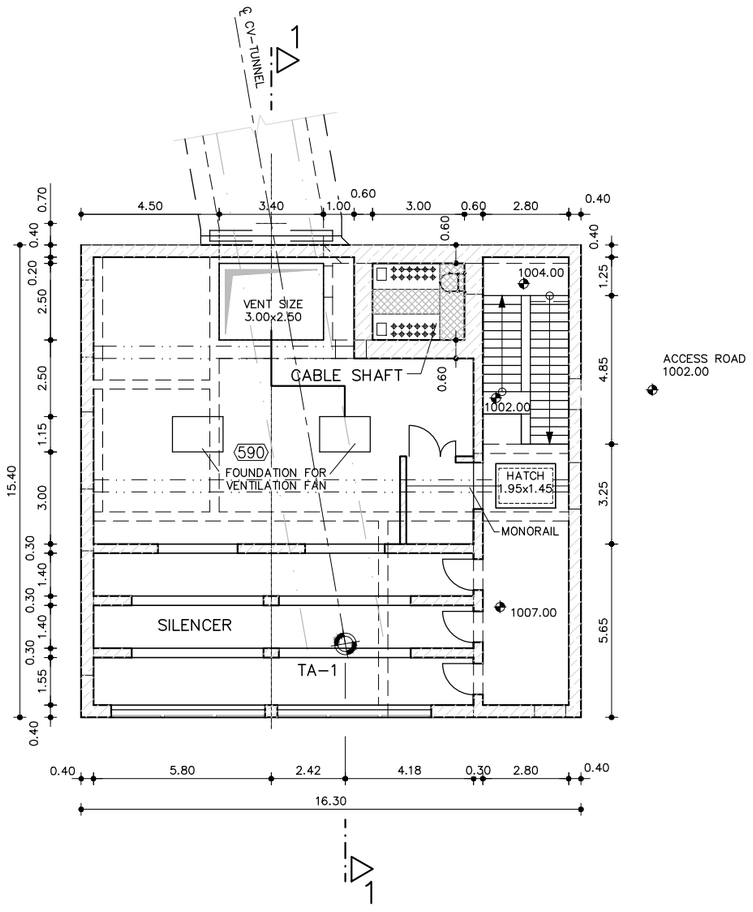
MAIN ELECTRICAL EQUIPMENT

NUMBER	DESCRIPTION
MAIN ELECTRICAL EQUIPMENT	
⟨503⟩	11kV SWITCHGEAR (6 CUBICLES)
⟨504⟩	AUXILIARY TRANSFORMER 1&2
⟨505⟩	DIESEL GENERATING UNIT
⟨506⟩	LVAC MAIN SWITCHBOARD
⟨507⟩	DC SWITCHBOARD

MAIN MECHANICAL EQUIPMENT

NUMBER	DESCRIPTION
MAIN MECHANICAL EQUIPMENT	
⟨252⟩	DEWATERING PIPE
⟨590⟩	SMOKE AND EXHAUST FAN

DRAFT STATUS: 29.10.2018



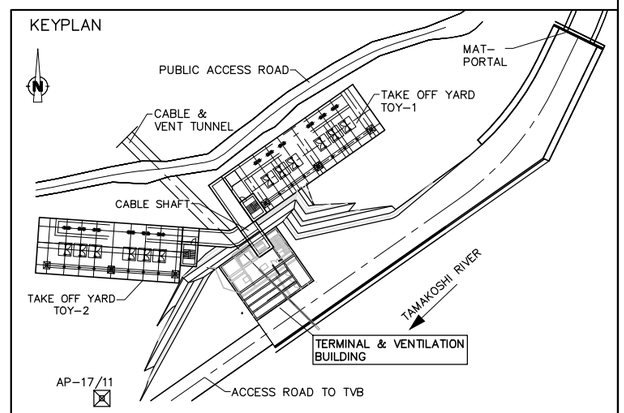
VENTILATION FLOOR
PLAN EL. 1007.00

NOTES:
1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO-ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).

LEGEND:
- CONCRETE CLASS C1 – CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- UNFINISHED TOP OF SLAB
- FINISHED FLOOR LEVEL
- FIXPOINT-COORDINATE
- ⟨206⟩ NUMBER OF EL-ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

SCALE 1:200
−2 0 2 4 6 8 10 [m]

KEYPLAN



Reference Drawings

Drwg. No.	Title
31-00053-DD-4390-1490	TERMINAL & VENTILATION BUILDING, LAYOUT

Revisions

	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	31.07.17
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:
31-00053-DD-4390-Y-0000_-

CAD- File No.:

Scale A3: 1:200

DETAILED DESIGN

POWER STATION

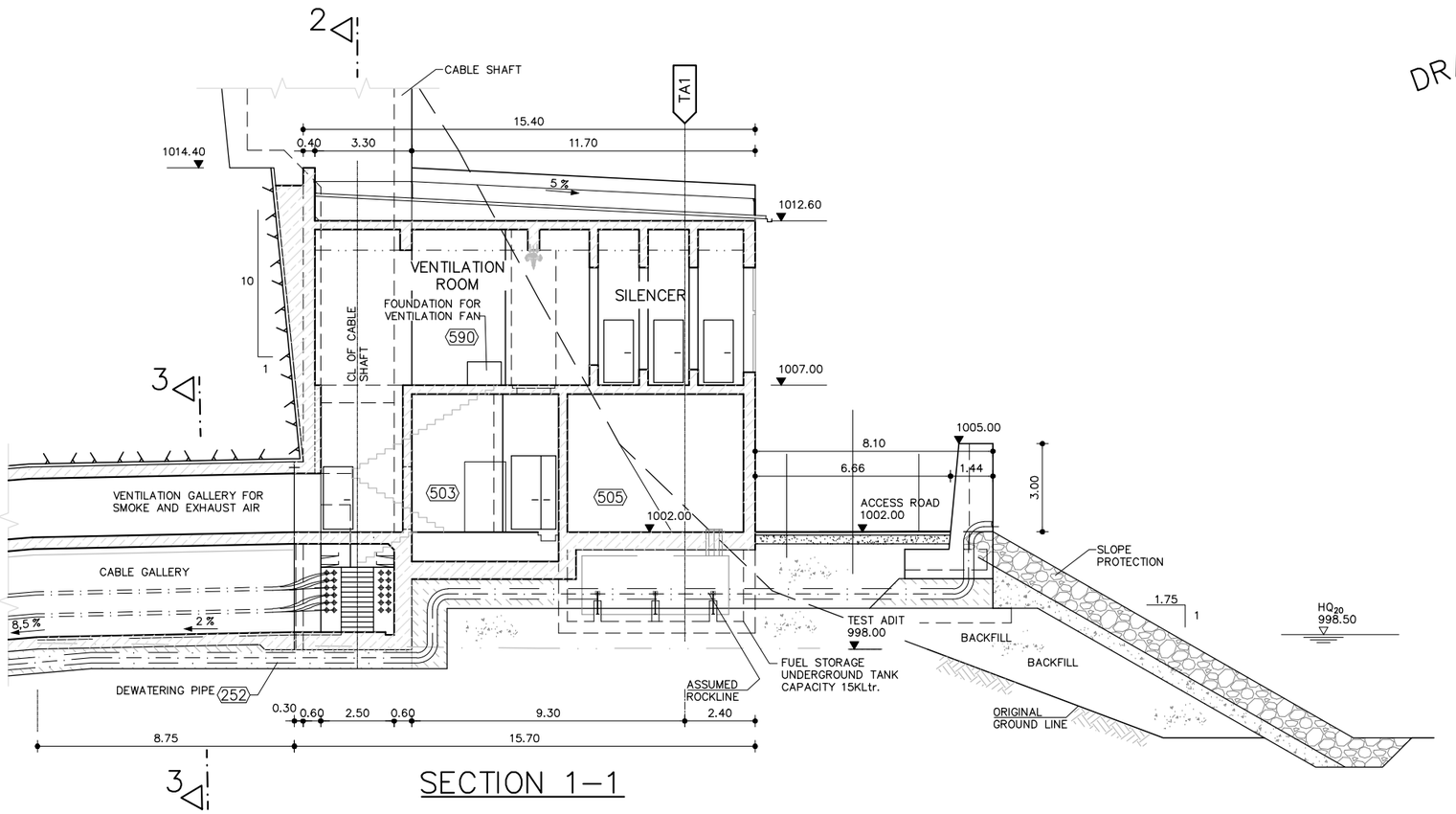
TERMINAL & VENTILATION BUILDING

FLOOR PLAN

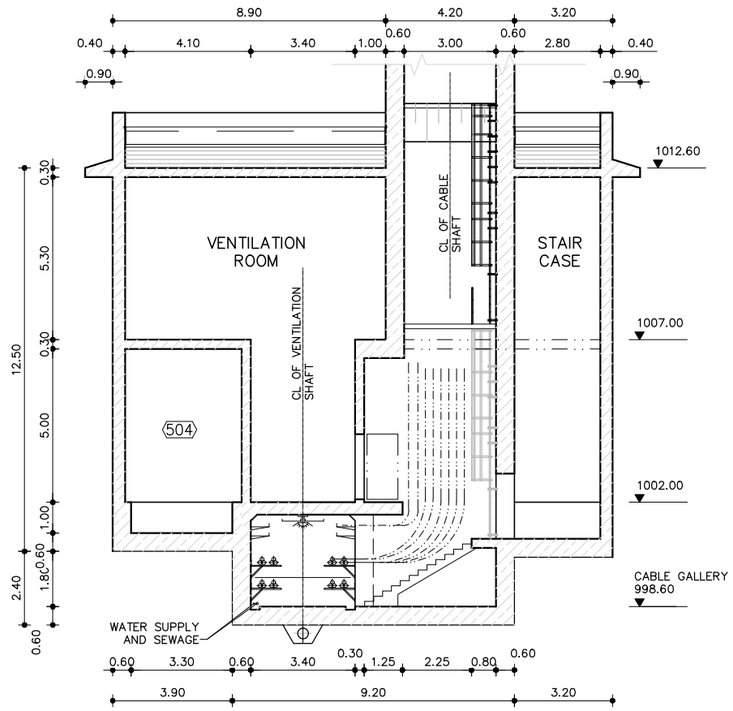
PROJECT DRAWING

Drwg. No.: 31-00053-DD-4390-Q 1491 REV. —

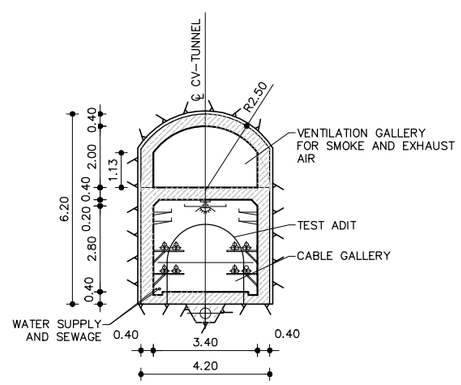
DRAFT STATUS:
30.10.2018



SECTION 1–1



SECTION 2–2



SECTION 3–3

NOTES:

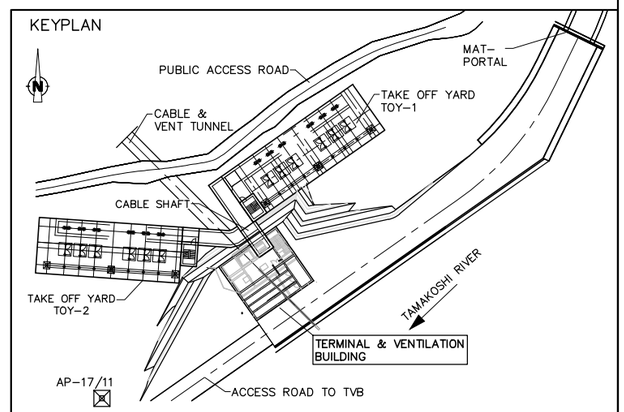
1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO–ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).

LEGEND:

- CONCRETE CLASS C1 – CONCRETE C25/30
- CONCRETE CLASS D – PREFABRICATED CONCRETE C35/45
- CONCRETE CLASS F – BLINDING CONCRETE C12/15
- BRICKWORK
- CONSTRUCTION JOINTS
- CHEQUERED PLATES
- ▽ UNFINISHED TOP OF SLAB
- ▼ FINISHED FLOOR LEVEL
- FIXPOINT–COORDINATE
- (206) NUMBER OF EL–ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

SCALE 1:200
–2 0 2 4 6 8 10 [m]

KEYPLAN



Reference Drawings

Drwg. No.	Title
31–00053–DD–4390–1490	TERMINAL & VENTILATION BUILDING, LAYOUT

Revisions

	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
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LAHMEYER INTERNATIONAL
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Replaces Drwg. No:
31–00053–DD–4390–Y–0000_–

CAD– File No.:

DETAILED DESIGN

POWER STATION

TERMINAL & VENTILATION BUILDING

SECTIONS 1, 2 AND 3

PROJECT DRAWING

Scale A3: 1:200

Drwg. No.: 31–00053–DD–4390–Q 1492 REV. –

DRAFT STATUS:
29.10.2018

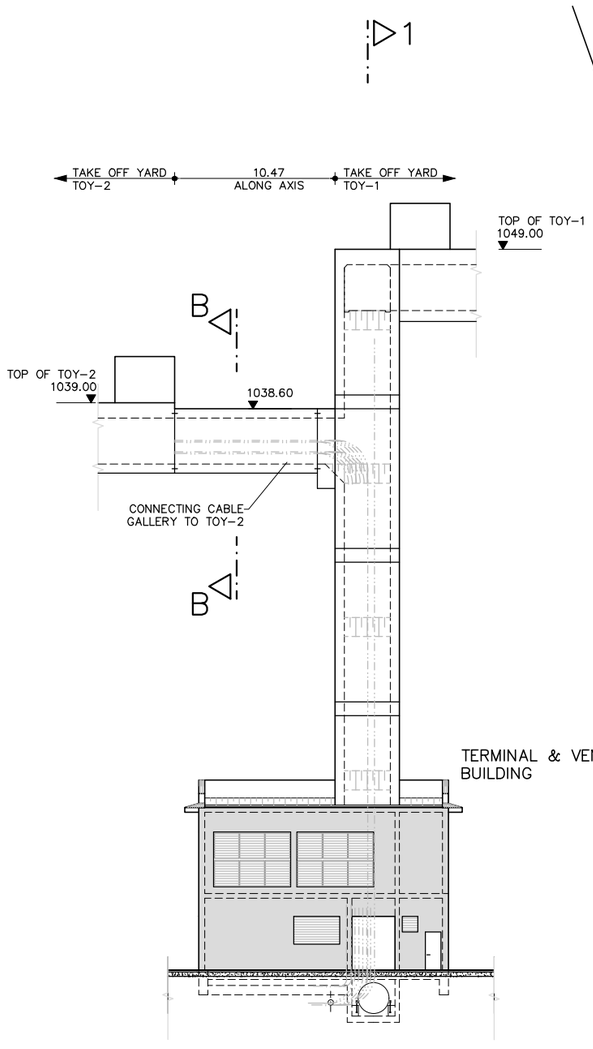
NOTES:

1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. CO-ORDINATES BASED ON NATIONAL GEODETIC NETWORK SYSTEM (EVEREST 1830).

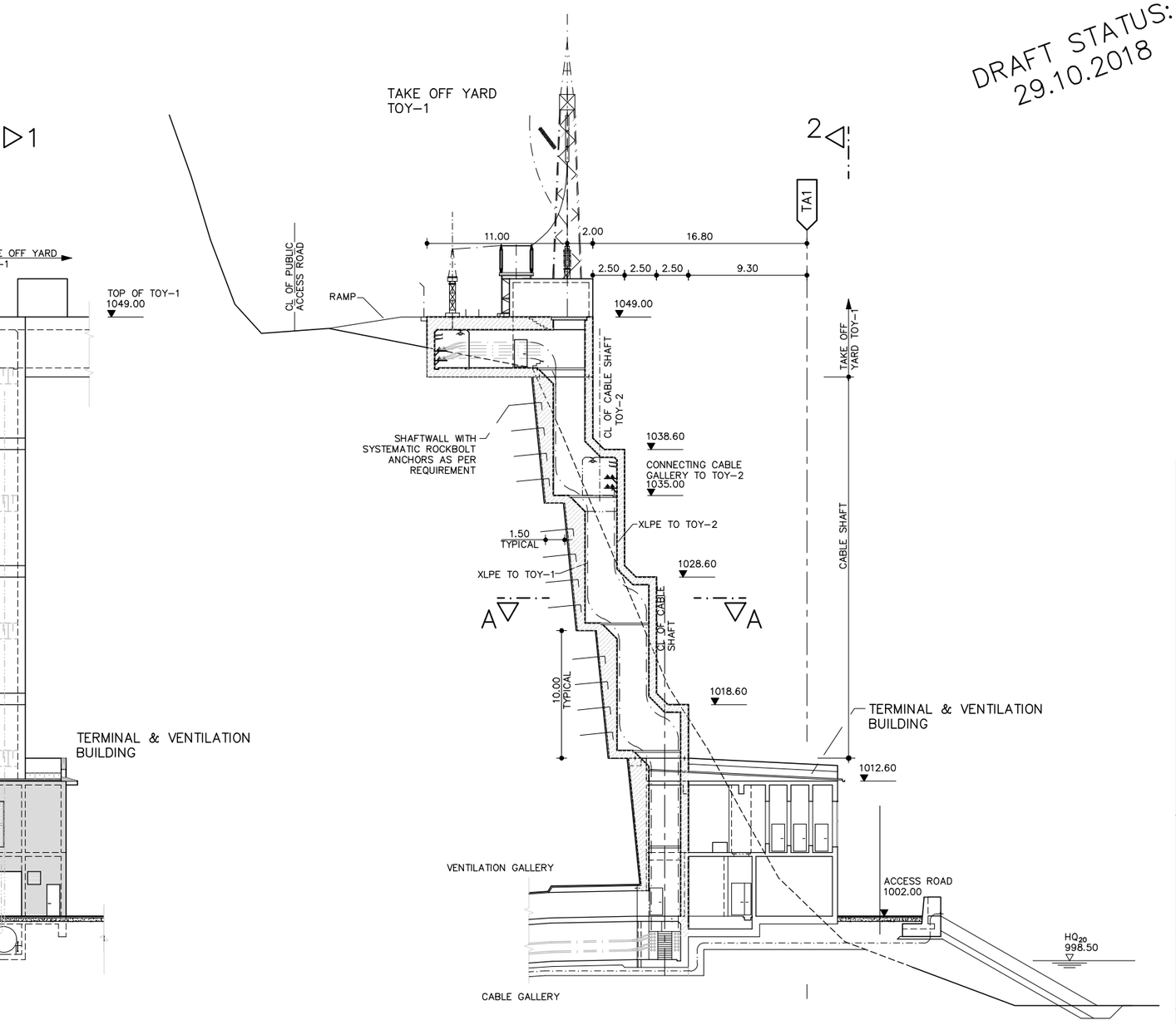
LEGEND:

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- CONCRETE CLASS F – BLINDING CONCRETE C12/15
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- CHEQUERED PLATES
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- (206) NUMBER OF EL-ME EQUIPMENT REFER TO LIST OF EQUIPMENT
- (R 206) ROOM NUMBER

SCALE 1:200
−2 0 2 4 6 8 10 [m]

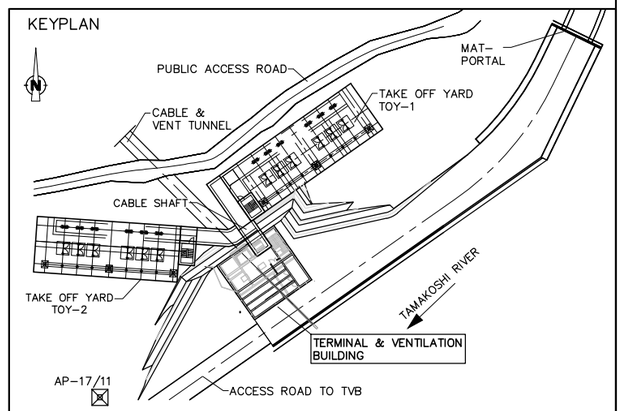


SECTION 2-2
SOUTH-WEST VIEW
SCALE 1:400



SECTION 1-1
CABLE SHAFT
SCALE 1:400

KEYPLAN



Reference Drawings

Drwg. No.	Title
31-00053-DD-4390-1490	TERMINAL & VENTILATION BUILDING, LAYOUT

Revisions		Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
CONSULTING ENGINEERS
BAD VILBEL, GERMANY

TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	31.07.17
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:

CAD- File No.:

Scale A3: 1:400

DETAILED DESIGN

POWER STATION

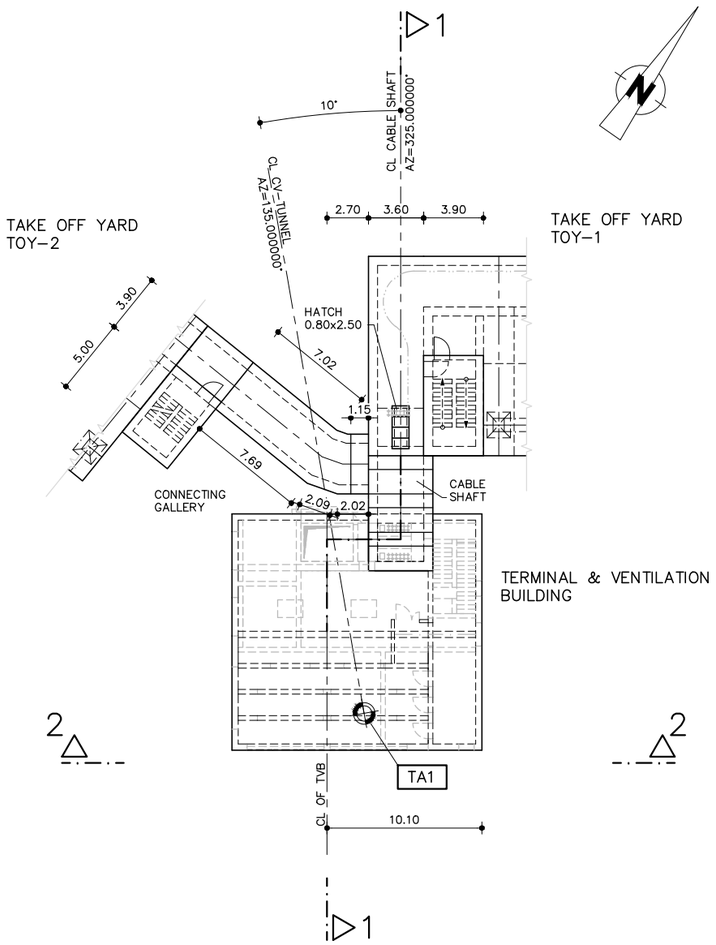
TERMINAL & VENTILATION BUILDING

CABLE SHAFT AND GALLERY SECTIONS

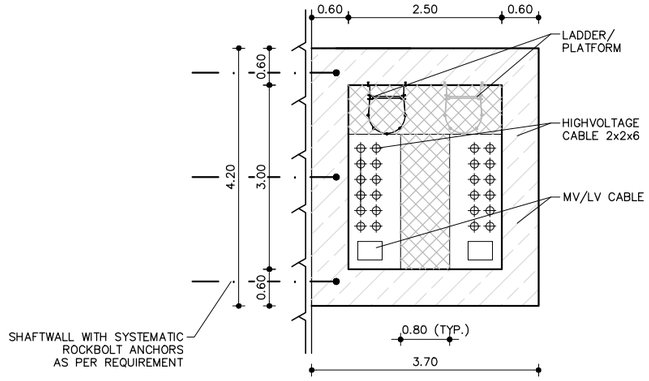
PROJECT DRAWING

Drwg. No.: 31-00053-DD-4390-Q 1493 REV. –

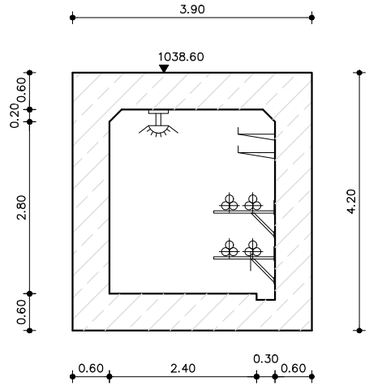
DRAFT STATUS:
29.10.2018



LAYOUT
TVB AND TOY
SCALE 1:400



SECTION A–A
CABLE SHAFT
SCALE 1:100



SECTION B–B
CABLE GALLERY
SCALE 1:100

NOTES:

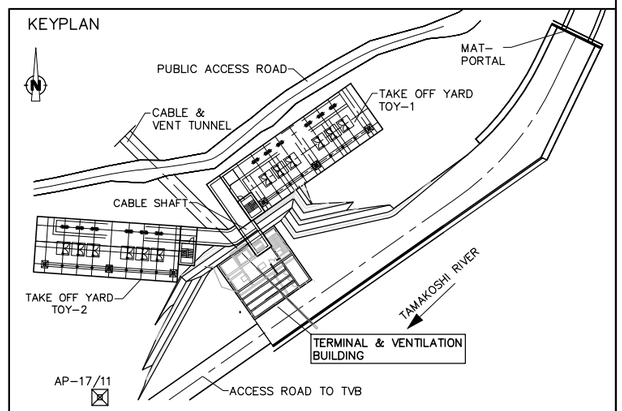
1. ALL DIMENSIONS ARE IN METER [m] UNLESS OTHERWISE NOTED.
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- FIXPOINT–COORDINATE
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- (R 206) ROOM NUMBER

SCALE 1:100
–1 0 1 2 3 4 5 [m]

KEYPLAN



Reference Drawings

Drwg. No.	Title
31–00053–DD–4390–1490	TERMINAL & VENTILATION BUILDING, LAYOUT

Revisions

	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
PROJECT DEVELOPMENT DEPARTMENT
ENGINEERING SERVICES DIRECTORATE
NEPAL ELECTRICITY AUTHORITY

LAHMEYER INTERNATIONAL
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TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:

CAD– File No.:

Scale A3: 1:400, 100

DETAILED DESIGN

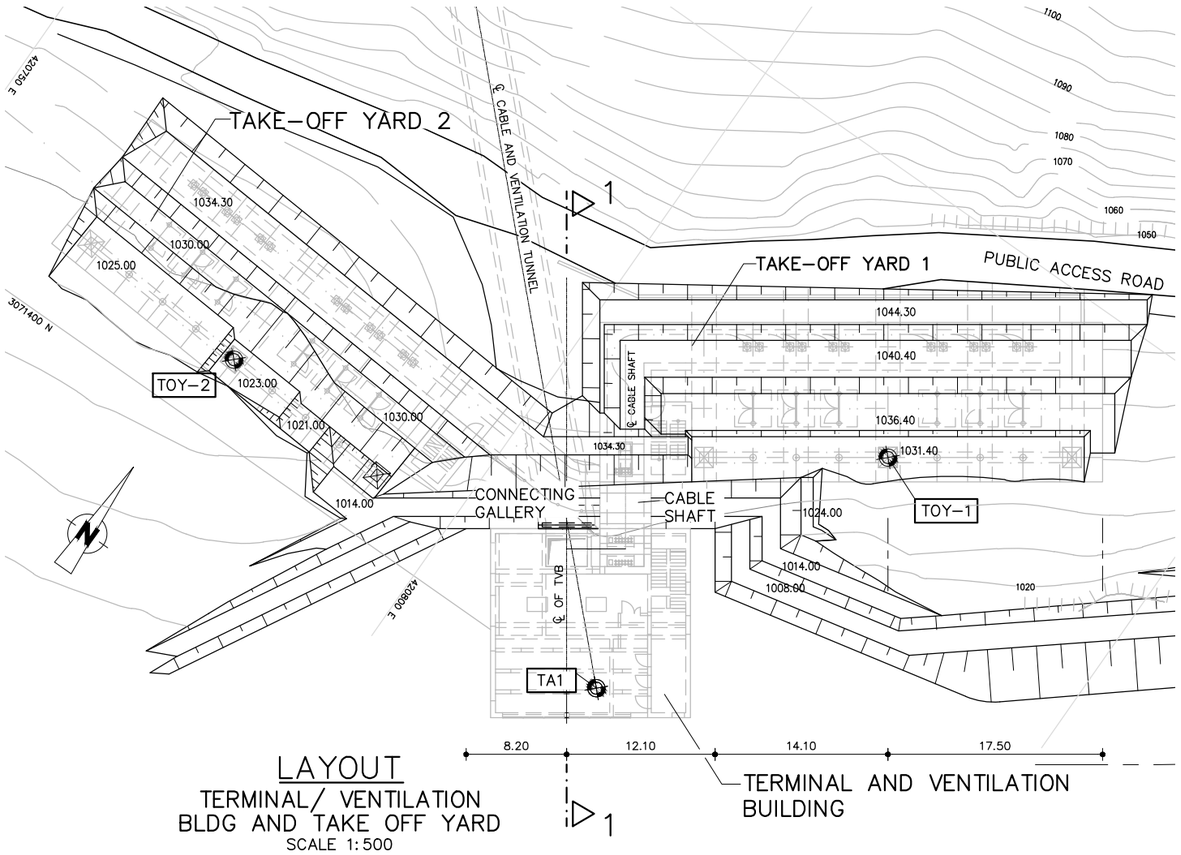
POWER STATION

TERMINAL & VENTILATION BUILDING

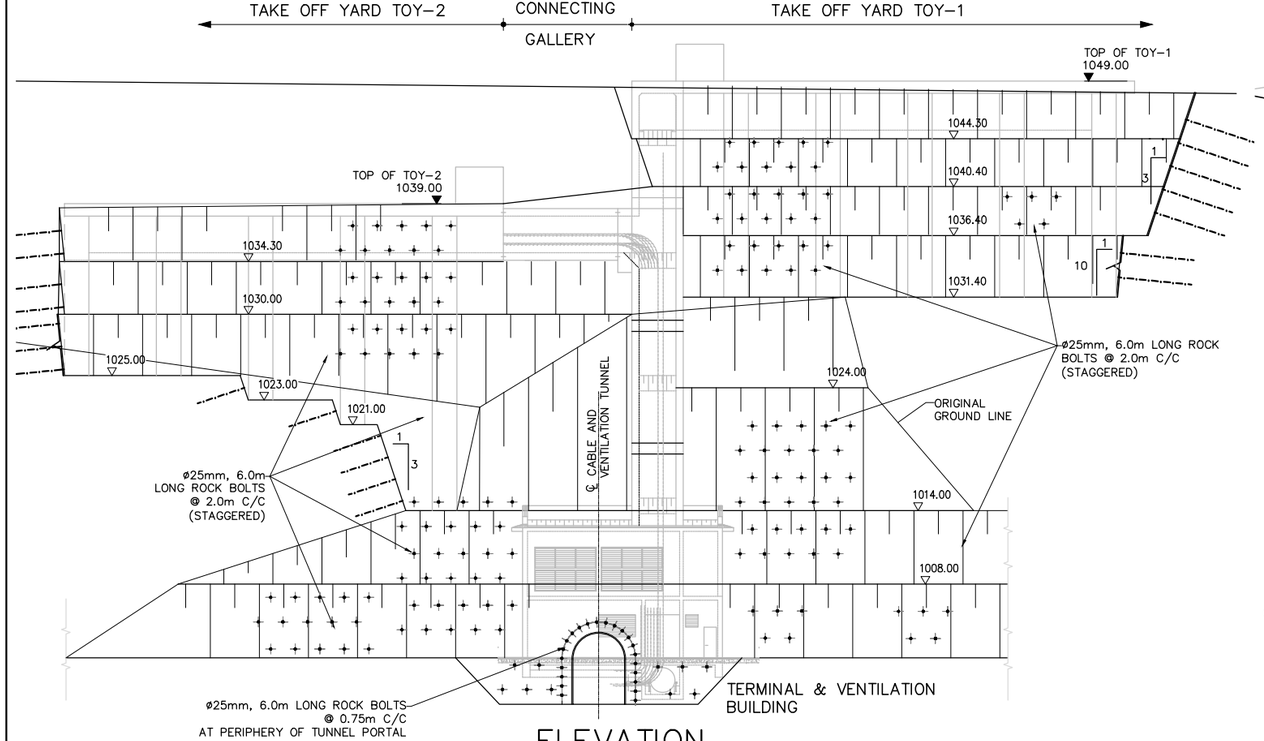
CABLE SHAFT AND GALLERY
LAYOUT, DETAIL SECTIONS

PROJECT DRAWING

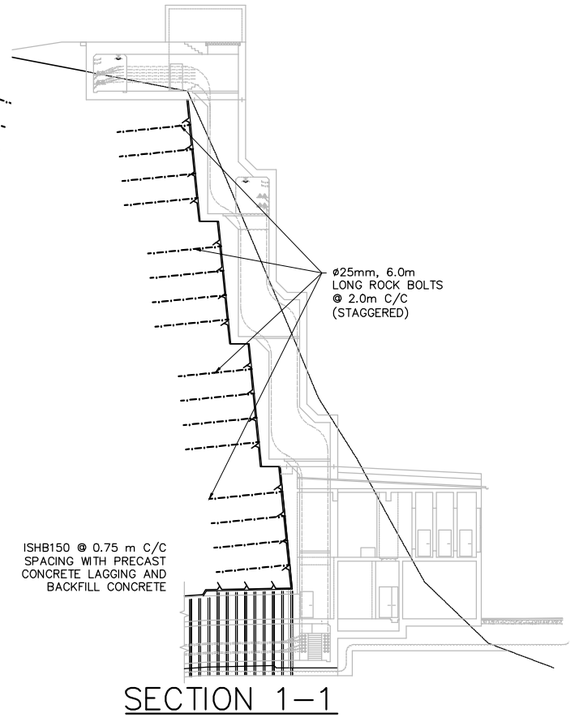
Drwg. No.: 31–00053–DD–4390–Q 1494 REV. –



LAYOUT
TERMINAL/ VENTILATION BLDG AND TAKE OFF YARD
SCALE 1:500



ELEVATION
SOUTH–WEST VIEW
SCALE 1:500



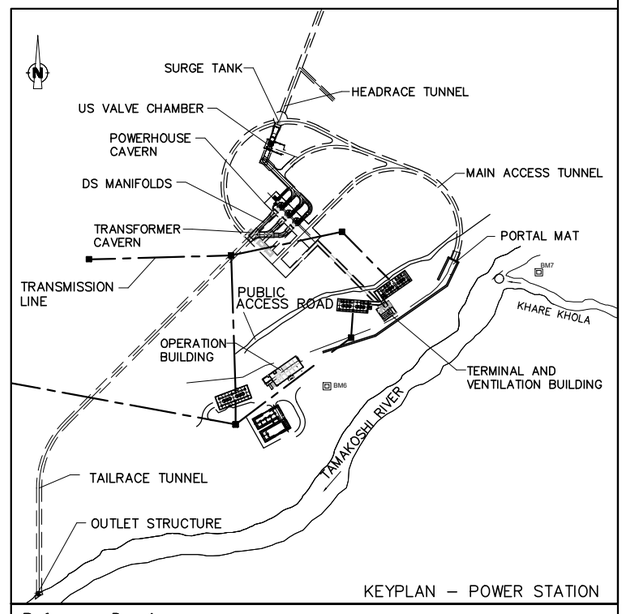
SECTION 1–1
ROCK SUPPORT
SCALE 1:500

NOTES TO ROCK SUPPORT:
1. ROCK BOLTS SHALL HAVE THE FOLLOWING CHARACTERISTICS:
 - DIA. 25 MM
 - YIELD STRENGTH 500 N/MM²
 - MAXIMUM TENSILE CAPACITY 213 KN
2. THE SHOTCERE MIX SHALL HAVE 28 DAYS OF COMPRESSIVE STRENGTH OF 35MPa.
3. STEEL RIBS SHALL CONFORM TO IS:226–1975.
4. AN ADDITIONAL LAYER OF 50MM THK PLAIN SHOTCRERE SHALL BE APPLIED ON THE EXPOSED PARTS OF STEEL RIBS FOR PROTECTION AGAINST CORROSION.
5. ROCK SUPPORT MEASURES SHOWN ON THIS DRAWING ARE PRELIMINARY ONLY. FINAL ARRANGEMENT OF ROCK SUPPORT (SHOTCRETE THICKNESSES; LENGTH, ORIENTATION AND GRID OF ROCK BOLTS) HAVE TO BE ADOPTED TO ACTUAL GEOTECHNICAL CONDITIONS, SUBJECT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR.
6. THE APPLICATION OF ROCK SUPPORT CLASSES (RSC) DEPENDS ON THE ACTUALLY ENCOUNTERED CONDITIONS AND GEOTECHNICAL MONITORING AND SHALL BE DECIDED BY THE RESPONSIBLE SECTION ENGINEER/GEOLOGIST.
7. CONTOUR BLASTING HAS TO BE DONE SMOOTHLY WITH MINIMUM DAMAGE TO THE REMAINING ROCKMASS AND AVOIDING OVERBREAKS AS MUCH AS POSSIBLE.
8. BOLT ORIENTATION SHALL BE ADAPTED TO ENCOUNTERED REQUIREMENTS, INSTALLED PERPENDICULAR TO THE ADIT PROFILE, IF DEVIATION FROM VERTICALITY REQUIRED SHALL BE RESTRICTED BELOW 30°.

NOTES:
1. ALL DIMENSIONS ARE IN METERS [m] UNLESS OTHERWISE NOTED.
2. ALL ELEVATIONS ARE ABOVE SEA LEVEL IN [masl].
3. EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE = THE CLEAR PROFILE OF THE STRUCTURE. THE EXCAVATION LINE HAS TO BE ADJUSTED ACCORDING TO THE ACTUAL GEOLOGICAL CONDITIONS.
3. ALL SHOTCRETE SHALL PLAIN SHOTCRETE WITH WIRMESH IF ASSIGNED IT ACCORDING TO ROCK SUPPORT.

DRAFT STATUS:
31.10.2018

SCALE 1:500
–5 0 5 10 15 20 25 [m]



KEYPLAN – POWER STATION

Reference Drawings

Drwg. No.	Title
31–00053–DD–4390–1491	TERMINAL AND VENTILATION BUILDING, SECTIONS

Revisions	Name	Date	Notes

TAMAKOSHI V HYDROELECTRIC PROJECT
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TAMAKOSHI V HYDROELECTRIC PROJECT
DETAILED ENGINEERING DESIGN

	Name	Date
Prepared	B. Khadka	31.07.17
Drawn	B. Khadka	
Checked	Roloff	
Approved	Dr. Moeller	

Replaces Drwg. No:

CAD– File No.:

Scale A3: 1:500

DETAILED DESIGN

POWER STATION

TERMINAL & VENTILATION BUILDING

EXCAVATION AND ROCK SUPPORT

PROJECT DRAWING

Drwg. No.: 31–00053–DD–4390–Q 1495 REV. –